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THE AMERICAN GAS LIGHT JOURNAL

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[OFFICIAL NOTICE.]

Committee on Nomination of Officers, American Gas Light Association.

OFFICE OF THE SECRETARY, PROVIDENCE, R. I., May 25, 1894.

I hereby give official notice that, at a meeting of the Council of this Association, held at Cleveland, O., May 15, 1894, there were appointed (as per the appended list) members of the Committee to Nominate Officers for the Association for the year beginning October 19, 1894, said Committee to report to the Association on October 17, 1894, at Washington, D. C.:

F. H. Shelton (Chairman), Philadelphia, Pa.; M. S. Greenough, Cleveland, O.; D. H. Geggie, Quebec, Canada; F. S. Richardson, North Adams, Mass.; G. T. Thompson, St. Louis, Mo.

Respectfully, A. B. SLATER, JR., Secretary.

[OFFICIAL NOTICE.]

Committee of Arrangements, American Gas Light Association.

OFFICE OF THE SECRETARY, PROVIDENCE, R. I., May 25, 1894.

I hereby give official notice that at a meeting of the Council of this Association, held at Cleveland, O., May 15, 1894, there were appointed (as per the appended list) members of the Committee on Arrangments for the 22d annual meeting of this Association, to be held at Washington, D. C., beginning on October 17, 1894:

C. B. Bailey (Chairman), Washington, D. C.; J. S. McIlhenny, Washington, D. C.; Wm. Henry White, New York City; John McIlhenny, Philadelphia, Pa.; T. J. Hayward, Baltimore, Md.; C. H. Dickey, Baltimore, Md.; Frederic Egner, Norfolk, Va.; A. B. Slater, Jr., Providence, R. I. Respectfully, A. B. SLATER, JR., Secretary.

BRIEFLY TOLD.

THE STATE OF TRADE.—We are now in the last month of the first half of 1894, and a word or two about the state of trade would not seem to be inappropriate. We wish we could say from our knowledge of the condition of the gas business, which knowledge is based on written and verbal reports from the representatives of Companies in widely separated districts, that the trade is showing a substantial gain or increase over the standing enjoyed by it a twelvemonth ago; but we cannot do so. On the contrary, the net result seems to be a shrinkage or a loss. The returns for this period show marked eccentricities, in that many of the medium sized works report losses, while others of about even size, and in seemingly identical circumstances of position and surroundings, report gains. Then, again, in the larger places like results seem to have been reached. On the whole, the average loss is less than 5 per cent.—to be accurate, 4.70 per cent.—which does not afford serious ground for unhopeful reflections; but the puzzling part of it all is the unevenness of the gains and the losses, for there really is nothing to be gained from the figures in the nature of pointing from them a prediction as to whether the end of the shrinkage is close at hand. One thing, however, we have noticed in the reports, which might sustain the thought that

the erratic atmospheric conditions that existed in different sections of the country on the same dates had not a little to do with the sendout incongruity. For instance, in the Middle States, during April and early May, localities separated by not over 200 miles experienced the most diverse climatic conditions. On a given day one place had really cold and markedly gloomy weather: whereas on the same day, another place, not over 200 miles away, had really warm and remarkably bright weather. Gas men, of course, know to the full what these opposites mean on the gas consumption of large or even medium cities and towns; so perhaps the weather is to be charged with much of the seeming eccentricities which have kept the gas men guessing this spring. Apart from the actual presentation of the figures and that which they indicate on the surface, we have no hesitation in saying that the general expression respecting the immediate future of the business is undoubtedly optimistic; for many notably close observers have said within our hearing that the days of increasing percentage are near. They will be warmly welcomed by both master and man.

MR. LITTLETON'S RETIREMENT FROM THE WESTERN'S SECRETARYSHIP.—From all quarters come expressions of sincere regret over the action taken by Mr. Littleton in resigning the Secretaryship of the Western Gas Association, a regret that is strongly shared by us, for the relations which existed between that gentleman and the JOURNAL, during his long incumbency of the post, were sufficiently close to enable us, perhaps better than any other, to fully appreciate at its true worth his faithfulness to the Western Association. And to that we might add, faithfulness was not the only characteristic of his capacity in serving the Association. Indeed, everything that goes to make up the successful Secretary was to be found in him, and his administration of the office was honest, accurate, manly and clean. But there is another side to his resignation of the office that ought to be shown, since some have had, in "the wildness of their grief," the ill-balanced word to say that the Secretary ought not to have retired, for they feared the Association would suffer. Possibly it may, but even the wildest of the mourners ought to remember that it is possible Mr. Littleton has "suffered" a trifle himself; and it is an open secret to many that had his own wishes been consulted solely in 1889 and since then, he would have resigned in that year or in those which followed. In fact, it was only with the greatest reluctance that he held the reins, a reluctance, however, that never caused him to falter in his duty when over-persuaded to remain. As we have remarked, to no other man does the Western Association owe so much of its wonderful success as it does to Mr. Littleton, and that knowledge fully repays him for the arduous and well sustained labor which he devoted to its advancement.

HORNBY'S GAS ENGINEERS' LABORATORY HANDBOOK.—We are in receipt of a copy of "The Gas Engineers' Laboratory Handbook," by Mr. John Hornby, F.I.C., of London, through the courtesy of Messrs. Spon & Chamberlain, publishers, of this city. As said by the author, there is "not much scope for originality in a book of this description," wherefore his aim was to collect together and arrange, "in a convenient and easily accessible form the scattered literature dealing with the various subjects treated on;" and we can truthfully say that Mr. Hornby has succeeded most admirably in the undertaking. The work is divided into five parts, and the gas man who cannot find in its pages the particular point upon which he is looking for assistance will have in hand a task extraordinarily out of the way. The text is practical and simple, and is freed as far as possible from undue technicalness, and he has digested the systems of many high authorities with pleasing facility. The work, which is well printed, handsomely bound and nicely illustrated, has been priced by the publishers at $2.50, and orders for it may be sent to the JOURNAL office.

NOTES.—Mr. I. C. Copley, the "managing man" of the Aurora (Ills.) Gas Light Company, has placed an order with the United Gas Improvement Company for one of the latter's improved Lowe double superheater settings, the calculated capacity of which is something over 300,000 cubic feet per 24 hours. Work under the contract will be commenced immediately, and it is expected the plant will be in operation by August 15.——The Danville (Ills.) Gas, Electric Light and Street Railway Company will expend $10,000 this season on its power station.——The Menominee (Mich.) Gas Light and Fuel Company will build a new retort house, which rather goes to show that Superintendent Elbert means business. He has shown further evidence of it by fitting up a handsome new office in the Perket Block, where the Company need not be ashamed of receiving its patrons.——Mr. G. W. Benedict has leased the combined gas and electric light plant at Washington, Ia., for a term of 20 years. The old buildings have been demolished, and a new brick structure, 25 feet by 62 feet, is to replace them. The new plant will be of modern type, and from 2½ to 3 miles of pipe will be added to the distributing system. The price of gas has been reduced to $2, from $2.50 per 1,000 for lighting purposes, and from $2 to $1.25 for fuel use.

[OFFICIAL REPORT.—REVISED BY THE SECRETARY.—Continued from page 774]

SEVENTEENTH ANNUAL MEETING, WESTERN GAS ASSOCIATION.

HELD AT CLEVELAND, OHIO, MAY 16, 17 AND 18, 1894.

FIRST DAY—AFTERNOON SESSION.

The President—The next paper to be read is that by Mr. I. C. Copley, of Aurora, Ills., on

HOW TO MAKE SMALL ELECTRIC LIGHT PLANTS PAY.

Mr. President and Gentlemen:—I am convinced that it is impossible to independently operate an electric lighting plant, at a fair profit, in the smaller cities embraced in the territory of this Association (having a population of less than 25,000) under the conditions that obtain in a very great majority of them. However gratifying this conviction may be to those of us who have been compelled to compete with the much lauded "light of the sun," through all the stages of its extravagant claims and praises, we are much more deeply interested in the question "How to make a small electric light plant pay." And, as gas men, we are most anxious to know if such a plant can be made profitable, in conjunction with the gas industry.

I do not wish to be understood as suggesting a method for each, or any, of my associates to follow, but merely to call attention to conditions that are favorable for the joint operation of these two branches of the lighting business, with an adequate return for the money invested in the electric lighting department. And, if these conditions can be brought about, to recommend the joining of the two interests. Local conditions vary so widely, and the local habits and prejudices of the consumer cut so decided a figure in the conduct of our business, that one who is by necessity entirely unfamiliar with all these circumstances, cannot lay down a few abstract facts and show you all how to make money by simply joining a gas and electric lighting plant.

The altogether abnormal development which has characterized electric lighting in the past, due to the persistent supply man (and I am sure no one who has had experience will question that his mendacious persistence is without parallel in the history of trade), due also to the ignorance of the investor (which cannot be disputed, for the light was but a few years old, and which is not disputed even by those whose pride would naturally prompt them to do so), and due still further to the well known eagerness with which an American public, and particularly in the Western States, seizes upon anything novel, seems to have reached its limit. The supply man may be none the less persistent or mendacious; but the investor is much better informed and less gullible, while the consumer has tried the new light and satisfied himself that in general it is neither as satisfactory nor as cheap as the one it seeks to replace.

The business, then, is rapidly coming around to commercial lines, though retarded in many instances by the prejudice of disappointed rivalry. This is of great advantage to the gas industry, even more so in case of one management for both plants, although it may lessen the desirable features, as we shall later observe.

The most hopeful of the many papers on this subject, heretofore read before similar conventions, have never claimed a direct profit resulting from such ownership that was in any way commensurate with the outlay of capital necessary and the hazard of the enterprise. But there is one phase of the question I have never heard discussed, and, to me, it is the most important. It is the profit accruing to the gas company as a result of combined ownership—an indirect profit, if you please, on the money invested in electric lighting equipment. Let us suppose an ably managed gas company to have been first to cover its field with the new light. By judiciously timing such a start and investing only as fast as the state of the business would warrant (not at the suggestion of the interested supply man), an expensive competion would have been averted. I shall not attempt to give figures on the direct saving that would have resulted. It is a matter of many small items constantly expended, and may be large or small in amount according to the policy of the management of the companies. I have written several gas companies, operating in competition with the electric light, asking an estimate on the direct annual cost of operating, as a result of such competition. The answers vary as greatly as the pro rata output in different cities, and very much in the same proportion, when local conditions do not complicate the situation. In other words, wherever the policy of the gas company has been liberal and progressive, and money and energy have been expended, with good judgment, there you will

usually find a better pro rata output than in another city, similarly situated, where the gas company has made no such determined effort. Is it not fair to assume that the two circumstances are connected? If each one of you who is managing a gas plant independently will carefully go over his accounts for running expenses I am sure he will agree that many items could be cut off were it not for the constant menace that the other fellow would get the trade. How largely this enters into the policy of management and allows the delinquent list to creep up can only be determined by each individual manager. In addition to these possible means of saving, let me briefly run over the regular stock of arguments always used on this much discussed subject. There is economy of labor at plant, economy of steam, etc., salaries of bookkeeper and collectors, rent and all the incidental expenses necessary in keeping the office up to the standard. These are the direct and material savings, but the greatest advantage comes from the indirect profit arising from the combined ownership.

That manager of gas and electric lighting interests in a small city who has both gas and incandescent electric lights to sell at rates reasonable in proportion to cost of production and desirability at the same time, and who cannot convince the patrons of his company that gas more nearly meets his requirements, is certainly not in touch with the needs of his consumers, and, as such, is doing his company an injustice. Arc lighting has a sphere of its own. It is not entirely distinct from that of gas, but so much so that the competition is usually devoid of intense feeling. The incandescent light has many of the conveniences of the gas burner and enough that it does not possess to afford a plausible ground for competitive canvassing. These have been placed before the public in all their attractiveness and with all the recklessness of capital unlimited and deceived. And wherever gas has been denied an able and energetic advertisement, the former has made serious inroads in the profit account of the gas company. Wherever the two are owned and managed together the inclination of the public (which we have all experienced and most of us suffered) to give the new light a trial has been very much lessened; for the inclination is not alone to give the new light a trial, but also to give a competing company sustenance. Human nature is thus a potent factor in our business relations. The consumer who gets his information from a source as unprejudiced as the manager of two such companies ought to be, and who sees no opportunity to retard the growth and hamper the success of a possible bugbear of monopoly, is, in my opinion and experience, very likely to conclude for himself that gas more nearly meets his needs than does the electric light. The result is perfectly natural and very desirable; the company holds more of its old customers with gas and sells gas to more new ones.

Moreover, where the two lights meet in competition, the electric light allies itself with all the other enemies of the gas industry to hamper and cripple its usefulness and profit in the great and undeveloped field of fuel. The gas stove has no more active enemy to encounter upon its introduction than the wide awake agent of the competing electric lighting company. Particularly is the entrance hard to effect in new houses where the electric light man desires to shut out all possible competition, and gas once introduced, even for fuel, offers a menace, a possibility of supplanting ultimately. So it is deemed good policy to keep gas out entirely. Those of us in the Eastern and older Middle States do not appreciate this to such an extent as our associates who manage gas plants in the mere rapidly growing cities of the Western States, where many of the new, and a large proportion of the best, houses are not piped for gas at all.

All this is preliminary to the answer to the question, "How to make small electric light plants pay," A few moments ago we considered the direct savings. We have now looked hastily at some of the combinations that may and do arise in the ceaseless and seemingly necessarily bitter competition with which the gas men are confronted. If, by a combination of ownerships, these may be avoided and the company be enabled to sell a greater amount of gas, it is very easy to realize a greater percentage on the total capital than on the lesser amount invested in the gas business exclusively, in competititon with the electric light.

You may say, gentlemen, that I am only suggesting a possibility; certain conditions under which such a plant might be made to pay. It is the only candid analysis I can give, for it is the only way I believe it can be made to earn money in the smaller cities—simply as an ally and associate of the gas selling business. So develop the demand for electric light that the expense of development will be reduced to a minimum, and that gas will receive its greatest benefits, during the process, in the amount sold.

Many able papers have been presented to the various Associations of "gas men" during the past few years on this and kindred subjects. The cost of producing electrical energy has been thoroughly gone over and made known; economy in management has been carefully canvassed, until you have access to all statistics that bear upon the conditions existing in your own cities.

My own contribution is entirely along the line of business policy. There still remains the bugbear of the future possibility in the development of electricity. Other things being equal, granted that we are earning, either directly or indirectly, a profit on our investment, do you not think it worth while to discount those possibilities? Do you not believe that the prior occupation of the field adds a permanence to the value of both plants? Each one of us must review his own situation and answer for himself. Whether these advantages are worth the cost or not depends upon the price paid for electrical machinery, either as first cost where the plant was new, or as the different conditions have appreciated or (more likely) depreciated the value of that used in the experiment of driving the gas company out of business; or whether on one of the flexible principles of reciprocity the gas company can install a plant on its own account and materially influence the depreciation of its competitors.

The public must be treated fairly; but the stockholders of the companies ought to share in that justice. Extensions of the electric department must be made on the same business lines as those which govern similar cases in the policy of the gas company. Prices must be consistent, and the annoying whims of consumers handled with the same judgment. If these conditions can be brought about I can guarantee any manager a reasonable profit through the combined ownership, together with a certain degree of contentment as nearly approaching comfort as the "light man" ever hopes to get.

If the municipal ownership craze takes possession of your city government, my advice, founded on experience, would be: Let the city light its own streets with its own electric lighting plant and you will hear little more of its going into a commercial enterprise as a source of profit. You will also have much less trouble from competing electric light companies, as will be apparent upon a moment's reflection.

Among the many examples I could cite to support my conviction on this subject the following will, perhaps, serve the purpose. There are two cities of nearly equal size within the territory of this Association so near together that local conditions are almost identical. Prices of gas and electric lighting are practically the same. In one the ownership is combined and the company sells 110 commercial arc lamps and has a total of less than 1,800 incandescent sockets, all on meters. It has over 2,200 gas meters and sells in round numbers 60 million feet of gas per year. In the other, the invariable hostile feeling prevails that always attends the rivalry between a gas company that refuses to be driven into bankruptcy and an electric lighting company that persists in hovering on the verge. Here there are 130 commercial arcs in use and over 12,000 incandescent sockets, partly on contract and partly on meter. The gas company has less than 1,000 meters and sells not more than 25 millions feet annually. I need not give you the relative amounts invested or the percentage of profit realized. Those may be a little abnormal, but they serve as striking examples of the extreme possibilities in the two different lines of policy.

My answer to the question "How to make a small electric light plant pay" would be: So handle your business that you sell enough more gas through the combined ownership and the profit will accrue in the actual money realized, and the permanence that will attach to the value of your plants.

Discussion.

The President—You have listened to quite an interesting paper, and Mr. Copley is ready to answer any questions or suggestions you may make.

Mr. Highlands—I would like to take issue with Mr. Copley over one point. He says, "If the municipal ownership craze takes possession of your city government, my advice, founded on experience, would be"—to let them go ahead and confine themselves to lighting the streets alone. I have in my mind several gas men who sincerely wish that such predictions were true. Unfortunately, however, it is almost the universal experience that when the smaller cities establish their own electric light plants they immediately go into commercial lighting, and as such they are building up a competition that will take more time, more money and more skill to get rid of than it would have taken to keep them out in the first place.

Mr. Odiorne—I think in the State of Illinois our Attorney General has decided that a municipal corporation has no right to sell any kind of light (either gas or electric) to private consumers.

Mr. Copley—In reply to Mr. Highlands I will say that, with the skill he has exhibited in the management of his own plant and the ability he

has shown to educate his public, I am convinced should he try it, or should that same skill be exhibited in the city which he has mentioned, as illustrated in opposition to this opinion of mine, it would be possible to so educate the people of his city as to the actual financial conditions which exist in supplying that light, that he would find them very much easier to deal with than the rival electric light company supplying apparatus, which is only too anxious to work up a corporation inside of that city with which to knock out the apparatus of somebody else. Aurora was the first city in this country to go into municipal lighting on its own account. It has an arc light plant now on which was spent between $65,000 and $70,000, from which something over 200 arc lights are supplied, the plant being operated in conjunction with the water works, which is also operated by the city. The amount of coal used for each—for the water works and for electric lighting purposes—is estimated; the salaries of engineers and firemen are also estimated; and though they have a magnificent system of water works, it scarcely pays the interest on the bonds. The electric light, however, is being furnished, as estimated by the Board of Public Works, at a very cheap rate. They estimate that it costs $56 per year per light; but that does not include depreciation or interest on the cost of the plant. They ran about 176 lights on an average throughout the year. By adding interest and depreciation, you can easily see that their lights cost them in the neighborhood of $80 per year each. Quite a number of cities in our neighborhood are paying for their lights from $80 to $100 per year each, from private corporations, and it seems to me we feel very much more secure, and also feel we are making out of it more than we possibly could make by taking contracts at such figures as we would have to take them in order to get such contracts. We let the city attend to its own lighting, and we sell the commercial light.

The President—If no one else has anything to say on the subject we will pass to the next business. We are very much obliged to Mr. Copley for his interesting paper. I will state here that the President of the Association appointed a Special Committee to confer with a Committee of the American Gas Light Association on "Federation," and I will ask the Chairman of that Committee to now make his report to the Association.

FEDERATION.

Mr. Ramsdell—The work of the Committee on Federation is not yet in such shape that we can make a definite report. About all that can now be done by the Committee appointed for this Association would be to report progress. The first Committee which was appointed, as you are all doubtless aware, was named by the American Association, and consisted of five gentlemen, of whom Mr. W. R. Addicks, of Boston, was the Chairman. This Committee appointed a day for a meeting, but as the time came around at least three members of the Committee could not be present, and so that meeting was abandoned. In the meantime Mr. Addicks prepared a draft for a framework of what was considered to be about the proper thing for organizing this confederation. At the time of the meeting of the New England Association we secured a meeting of this Committee for the first time. Four members were present—in fact all the members were present except Mr. Chollar, of St. Louis, who could not attend. At that time we went over the plan which had been prepared by Mr. Addicks, and which under the discussion of the Committee was very materially changed. In the judgment of the Committee—its final judgment at least—the plan as it then stood would not be successful, and would not meet with the approbation of the various Associations. I might remark here, before saying anything more in connection with the Committee, that the idea of the federation has become, I think, somewhat erroneous in the minds of the members of the various Associations. There is no desire to change or to interfere in any manner with the local government of any of the present Gas Associations. The federation will consist of an advisory committee (I think that would be the proper name for it) made up from members of the various Associations, who would carry forward certain lines of work, which would give a uniformity of work in the various Associations. I do not think I have stated that quite clearly, but the idea is to begin a simultaneous work on any given subject and carry it forward through the various Associations. The Committee held its second meeting here at this hotel, and the plan was still further revised. We think it is now in such shape that when presented to the various Associations it will meet with their approbation, if any plan of federation will. We met here and prepared a plan which will be made into, or rather which will be revised or rearranged into a constitution and by-laws. There was not sufficient time to complete this work, and present it to this meeting; and a sub committee has been appointed to take up this work at its earliest convenience, so that this constitution and by-laws will soon be ready for presentation to and action on the part of the various Associations. I might say that the other branch of work which is recommended, in addition to that of the adoption of standards, and securing uniformity of discussion in our various Associations is, the publication of our proceedings. The idea which now prevails, and which would be brought about by this federation, would consist in publishing these proceedings in book form, almost similar in character to that which has just been distributed by the American Association—in the form of a quarterly magazine. The proceedings of each of the conventions being furnished to an editor, and the work thus brought out in a quarterly magazine. Of course there are a good many little details that will have to be arranged for, but the first thing to be done will be to ascertain whether the various Associations want to go ahead with the scheme of federation. If they do, it is merely a work of detail to arrange the matter so as to be perfectly satisfactory to the various parties. I think, Mr. President, that is all that can be reported at this time, and the work will have to go over of course until a later meeting.

The President—We understand that this is simply a report with regard to the action of a committee given for the information of the Association.

Mr. Lansden—May I ask if the committee which was appointed is to report to this Association, or to the American Association?

The President—This committee was appointed by the President of the Western Gas Association, upon the request of the American Association, to confer with a committee of that Association, and therefore it should report to this Association.

Mr. Ramsdell—I should have stated that the meeting here at this time was a meeting of the various committees—a committee from the Ohio, the New England, the American, and the Western Associations. Each one of these Associations was represented here by its committee, so that the work as it now stands is the work of the joint conference committee, of which a meeting had been called. Of course each one of these committees will report back to its own Association.

Mr. Somerville—Is it understood that the report of the proceedings of the meetings of the various Associations will only appear in this magazine?

The President—That has not yet been decided. Mr. Ramsdell has just simply given the ideas presented; and that point has not yet been decided.

Mr. Ramsdell—You will notice I made the statement that there is no desire on the part of the committee to interfere in any manner with the local government of any of the Associations.

On motion of Mr. Somerville the report of the committee was received, and the committee was continued.

The President announced the appointment of Messrs. Irvin Butterworth, B. A. Ward and W. H. Odiorne as a committee on final resolutions, and then called upon Mr. E. G. Cowdery to read the paper by Mr. J. W. Stratton, of Valparaiso, Ind.—the author was detained at home because of illness in his family—on

SOME OF THE ADVANTAGES OF OIL GAS PLANTS FOR SMALL TOWNS.

Having been a member of this Association for several years past, and in attendance at most of its meetings since 1885, I have been somewhat surprised at the scarcity of literature bearing directly upon the subject of straight oil gas works.

There are at present quite a number of these in operation in the territory naturally contiguous to the Western Gas Association, and I have frequently met the managers of some of the works at our meetings, but have observed that, as a rule, they took very little part in the discussions, and I believe have offered no papers giving their individual experience, or asking for special information. This has caused me to think that perhaps they are so well satisfied with their position in the business that they do not care to exchange ideas with the rest of the fraternity, or else that they are lacking in enthusiasm.

It is not my purpose in this paper to state any new facts, or advance any startling theories; neither do I expect to offer anything of special value, and only consented in my own mind to attempt this production with the understanding that it was to fill in, should there be a paucity of papers, and to be omitted entirely in case of an abundance.

I have in mind many small towns, which are not now occupied by gas works, the condition of which, through lack of prospective growth, etc., would not warrant the outlay of a sum of money sufficient to install and equip the ordinary type of works in most general use, yet which might be made to furnish a comfortable support to an honest, industrious man, if reasonably installed and economically managed.

The ordinary average annual business that can be expected from sales of gas in towns of 4,000 to 6,000 people is $1.50 per capita of population. Business to this extent most assuredly does not justify any extravagant

investment, unless the prospect for immediate and substantial growth is assured.

For the small town an oil works sufficient to do all the gas business, can be placed in operation for about 50 per cent. of the cost of the ordinary style of coal or water gas works, and consequently might, from almost the start, be able to pay fair earnings on the investment, which could not be expected from the greater capitalization.

In a high grade gas to 60 or 80 candles standard, holder, mains, meters, services, buildings, grounds, and almost everything that goes into the construction account, can be very much smaller, and consequently cost less money than would be required for the more bulky gas, the proportion being about 3½ to 1.

The labor account for operating this works can be kept at a very low figure—any man of ordinary intelligence can learn in a few days to take care of them, nor is any previous knowledge of gas making essential. The oil flows to the retorts by gravity and is almost automatic in its action. The principal care is to regulate the amount and attend to the fire, for in the distillation of oil a more careful adjustment of heat is necessary than for coal.

The gas maker will have time in the summer season to assist the manager in pipe laying, house piping, meter setting, fixture hanging, etc., all of which should, in my opinion, be controlled by the owner or manager of the small works. This manager should keep the books, make out the bills, look after supplies, collections, etc., for there will be few ornamental officers or clerks in this combination. There need not be carried any extensive supply of stock for gas making purposes, but there should be provided an iron tank sufficient to hold at least 8,000 gallons of oil, which should be buried under ground.

For use in this retort system I would recommend gas naphtha of 63° to 65°, Baume's scale. Under the improved methods of refining, it is possible to procure this of high grade, uniform quality and reasonable price. The fuel can be coal, coke or wood, whichever, owing to the nature of the location, can be procured on the best terms. Personally I prefer 4-foot cordwood, for the reason that it affords a lively heat at the top of the bench without an excessive amount at the fire box, which, with coal, is destruction to the firebrick lining. I have seen natural gas used with excellent results for heating benches.

For retorts we use ordinary wrought iron or steel pipe, placing six in in a bench. The three upper, receiving the oil first, are the super heaters; the lower, getting the full force of the heat, are the fixing retorts proper. The upper last from 12 to 18 months; the lower from 3 to 6 months, dependent upon the iron, the make of gas, and the care which they receive.

The purification consists of washing and passing through dry scrubbers, which are simply perpendicular columns containing perforated diaphragms of sheet iron placed one or two inches apart, the gas passing up one and down the other in its passage to the holder; in our works there are four of these scrubbers.

A good feature of this gas is the fact that cold weather does not deteriorate it in the least, and in the winter, when the most light is required, it is on its best behavior. There being no sulphur in the gas, and just enough of an oily nature to preserve the leather and cases and lubricate the mechanism of the meters, they will last almost indefinitely, which makes it bad for our friends, the meter men, but gladdens the heart of the manager.

Another important factor in its favor is its harmless nature in case of leakage. With an experience of many years in the manufacture of this gas, I have yet to learn of any person who has received injury or positive discomfort from inhaling it.

Being possessed of a strong, pungent odor, leaks are easily detected, and if the "hayseed" should blow out the gas at the hotel, there would be no coroner's inquest in the morning, and you can enjoy the sleep of the just, knowing that you have in no way been instrumental in hurrying any one to the other shore.

The above are a few of the advantages of the oil gas works; many more could be given, but I do not wish to prolong this paper, nor do I suppose that my friends, the managers in the large cities, with their magnificent plants and colossal business, will adopt my recommendations. But to the poor fellow who is struggling along in the contracted field, scarcely making ends meet, it might prove a "Balm in Gilead." Yet, in this age of advancement and sharp competition, prosperity can only be attained by strict integrity, rigid economy, close attention to all details, and courteous treatment of the public. A man who follows any other course will find, sooner or later, that he has mistaken his avocation.

In my opinion, in no other business at the present time is such eternal and undying vigilance the price of success.

Discussion.

The President—As the author of the paper is not present, I presume the discussion will be limited; however, the subject is open for discussion.

Mr. Butterworth—If Mr. Stratton were here I would ask him if he experienced any difficulty from the stopping up of the pipes which he used for the retorts, by the deposit of lampblack or carbon. It is possible that someone here may be able to speak on that point in Mr. Stratton's absence.

Mr. McDonald—I had experience some years ago in a small gas plant of somewhat similar construction to this; and we had no serious trouble at that time with the stopping up of the retorts. If Mr. Stratton were here I would say one other word. Possibly he is right, but in the gas works I speak of a man was killed by the gas. The mode of manufacturing the gas was very similar to the one he speaks of; so it seems to me there is some danger from oil gas—if you try to sleep in it.

Mr. Odiorne—I would ask if anyone knows what size pipes or retorts those are.

Mr. McDonald—I think Mr. Stratton used either 6 or 8 inch pipes.

Mr. Ferrier—One statement made I wish to except to. He says: "In a high-grade gas of 60 to 80 candles standard, holder, mains, meters, services, buildings, grounds, and almost everything that goes into the construction account, can be very much smaller, and consequently cost less money than would be required for the more bulky gas." I think that in the case of mains and services, with gas of high specific gravity, they would be very much larger. I think that must be stated as an exception.

Mr. Gwynn—The reason Mr. Stratton speaks of using smaller pipes is that it does not require a large volume. A 1-foot to 2 foot burner is generally used; and the volume is so small that a small pipe can be used.

Mr. Lansden—I would like to ask Mr. Chollar a question. Is this not about the same quality of gas as that manufactured under the Pintsch system; and is not that considered deadly when it escapes?

Mr. Chollar—The gas described in Mr. Stratton's paper is identical with the Pintsch gas. The process of manufacture and purification is absolutely the same. The only difference between that and the Pintsch gas is that for distribution; in railroad cars the gas is compressed to about 200 pounds to the square inch in order to economize storage capacity. In regard to the illuminating power of the gas, as stated by Mr. Stratton, I may say we have made many experiments, and find it, as near as we can get at it, to be about 45 candle power. The consumption per burner is about one foot per hour; and consequently, as Mr. Gwynn stated, very small pipes will suffice for the distribution. The gravity of the gas is nearly equal to that of air. It will burn much more successfully with a draft (as in the Pintsch system) than when the gas is consumed in the ordinary open flame burner, for then it is liable to flicker. In the Pintsch system it is enclosed in a glass globe and it there burns very steadily.

The President—Mr. Lansden's question was if you did not consider the Pintsch gas as dangerous.

Mr. Chollar—No more so than ordinary coal gas.

The President—But you do consider it dangerous, if inhaled?

Mr. Chollar—Certainly; but not any more so than ordinary coal gas, and much less than water gas.

Mr. Lansden—I understood Mr. Stratton's paper to state that it was not dangerous.

Mr. Russell—I would ask Mr. Chollar what burner he uses?

Mr. Chollar—The only practical way with a bar photometer in burning and testing a high power gas is to use it with a burner small enough so that the gas can be burned without smoking. I have tried it in the photometer. We find in practice that gas made from ordinary oil has about one per cent. by volume of sulphureted hydrogen, and a trace of carbonic acid. In St. Louis we make it in rather large quantities, and it requires little lime to purify it. We purify about 80,000 feet per bushel of lime.

Mr. Ferrier—Can Mr. Chollar give us the quantity of carbonic acid in the gas?

Mr. Chollar—I have never determined the Pintsch gas for carbonic acid, but it would probably be very small—I think less than six per cent.

Mr. Hinman—I have had quite a good deal of experience in testing oil gas made by various processes, and in my experience I have found that it varied from 40 to 60 candle power. I had my burner burn less than one foot per hour and about five feet per hour. I have determined the proportion of carbonic oxide very exactly, and found that it was less than two per cent.

Mr. Gwynn—In reference to its being safe, and not dangerous in case of its discharge into a room, I will say that I have known where it was blown out in a room—an ordinary room 10 feet square—in a hotel, escaping all night, and the party who slept in the room came out all right, not even complaining of headache. I think that is due, however, to the small volume of gas discharged into a room. It was a 1-foot burner, so that in 10 or 12 hours the amount discharged was but a small quantity. You would not get as much in 12 hours through that burner as you would through an ordinary coal gas burner in an hour and a half.

Mr. McDonald—Mention was made of a man having been killed in an oil gas works. I attended the inquest, and some very eminent physicians were present who, having held a post mortem examination on the man, concluded that he was suffocated. That was the result of the examination. While there is not very much poison in the gas, there is enough of it to suffocate a man. It keeps the air from the lungs. He breathes the gas instead of air, and he cannot live on the gas.

Mr. Gwynn—I have had a little experience with an oil gas plant and consider it only a pocket edition of a coal gas works.

On motion of Mr. Thompson the thanks of the Association to Mr. Stratton for his paper, and to Mr. Cowdery for reading it, were voted.

The Association then adjourned, to Thursday, May 18, 1894, at 9:30 A.M.

SECOND DAY—MORNING SESSION—MAY 17.

The President called the Association to order at 9:30 A.M., and introduced Mr. James Ferrier, of Columbus, Ga., who read his paper on

THE INFLUENCE OF TEMPERATURE ON PURIFICATION.

When I announced, a few weeks ago, my intention of trying to throw some light on this subject, I had a very inadequate idea of the task which I had imposed upon myself. I state this as an apology for the meagerness of my experimental data, which, had I been able to carry out my original intention, would have been much more complete. I cannot expect them to carry conviction, although they may indicate a strong probability. Those of you who have tried to carry on business and experimental work at the same time will readily understand and excuse me.

My first experiments were directed towards discovering whether or not chilled gas would affect ordinary lead dietate test paper. I found that foul gas chilled in U-tubes as low as 4°, readily blackened moist test paper, although its effect on dry test paper was almost inappreciable. I may here state that all temperatures given throughout this paper are on the Fahrenheit scale.

After trying several methods of experiment with purifying materials I adopted the following as promising to yield the most reliable information:

(1) Oxide of iron. This was selected from a bed that had been exposed for some months, and from the same part of the bed. The coarser nodules, separated by a sieve, were rejected, and the sifted portion thoroughly minced; 28 ounces were then placed in two improvised purifiers, and throughout the experiments 16 ounces were placed in the first purifier and 12 ounces in the second. The purifiers consisted of the wash bottles so well known in the laboratory, using the short tube as the inlet and the long tube as the outlet. After having been tried at atmospheric temperature the purifiers were emptied and again charged with the same weight of purifying material. They were then immersed in a freezing mixture, and, in order to prevent raising the temperature by warm gas, it was chilled before it reached the purifiers by being passed through three V-tubes, also immersed in a freezing mixture. After leaving the purifiers the gas was led through the indicator. This consisted of another wash bottle, lined half way round with white unsized paper, kept continually moist by a solution of lead acetate into which the paper was dipped. In order to control the rate of purification a diaphragm was inserted in the tubing on the exit side of the indicator. The diaphragm was made by connecting two pieces of rubber tubing by a glass tube, one end of which was drawn out to a capillary. By breaking off the capillary, or slightly heating it, the opening could be made larger or smaller as desired. The same diaphragm was used during two experiments, one at atmospheric temperature, the other at low temperature. The gas was received in a meter prover, which served also as a meter.

(2) Lime. Some pieces of quicklime were slaked and cooled and the slaked lime thoroughly mixed. Two purifiers were then charged with the same weight of slaked lime. One was used and the other was sealed up to await the next experiment. Only one purifier was used in experimenting with lime. This was the *modus operandi* in the first two experiments with lime, but it was evident from experiment 6 that "something had gone wrong," as I found on emptying the purifier that the lime was dry and had been acted upon to a very small extent. It is probable that, despite sealing up, the moisture had left the lime and had condensed in the upper part of the bottle. Accordingly, in experiments 7 and 8, I adopted a more rigorous method. I weighed the quicklime, measured the water added, and weighed the slaked lime when cool, making the two of the same weight both dry and hydrated.

Eudiometric determinations of the amount of sulphureted hydrogen in the crude gas were made from time to time during the experiments, but no such variations were found as would account for the differences in the results. These results and particulars of the experiments are given in the appended table.

In experiments 4, 5 and 8, after the indicator had become fouled, I removed the U-tubes, removed the purifiers from the freezing mixture and immersed them in water at a temperature of 100° to 120°, at the same time placing a clean indicator. In all three cases the purifiers resumed their functions. The oxide showed gas free from sulphureted hydrogen after the first purifier, which, in the freezing mixture, had begun to show taint after 9 feet had passed. The gas, after heating the purifier, appeared dense and smoky, probably from illuminants condensed while in the freezing mixture. I also observed that the characteristic blackening of the oxide did not extend much below the level of the freezing mixture. In experiment 5 the lime purified 4 feet, after the temperature had been raised, also emitting a smoky gas. The gas, however, was still of a considerably lower temperature than the atmosphere, showing that the chill had not been completely removed. Experiment 6 must be "ruled out" as evidence, for reasons already given. In experiment 8 I found that the freeze and thaw had granulated the lime, probably preventing the action of a considerable quantity of it. The results of this experiment appear greatly at variance with those of No. 5. This may probably be accounted for by the fact that No. 8 was continuous, while No. 5 was interrupted owing to its duration, and may have allowed partial revival of the lime. I regret that want of time prevented me from making some experiments to test the effect of *desiccating* the gas apart from chilling it; this I reserve for future investigation.[1]

While the experiments appear to prove that the efficiency of both lime and oxide purifiers is impaired by a low temperature, they also seem to demonstrate that oxide is affected more than lime, at all events, in so far as the impurity of sulphureted hydrogen is concerned. This seems intelligible when we reflect that oxide exposed to the atmosphere is revivified—in the language of chemistry, ferrous sulphide is decomposed and ferric oxide again formed by the action of free oxygen. This is accompanied, as we all know, by the evolution of a considerable quantity of heat. Either heat must be absorbed, or compensating influences must be exerted to produce the reverse action. Evidently the absorption of a certain quantity of heat is necessary, although it is still a question whether the heat acts directly or indirectly by increasing through diffusion the influences of the water present.

With regard to lime I wish to direct attention to the papers on this subject read before the Chemical Society of Great Britain, by Mr. Veley, of Oxford University. Briefly stated, Mr. Veley has demonstrated: (1) That quicklime, in the absence of moisture, is totally inert towards such gases as carbon dioxide and sulphureted hydrogen. (2) That with just enough water to form the hydrate, lime is comparatively inert towards certain gases which otherwise it absorbs readily. (3) That the absorptive properties of the hydrate are vastly increased by the addition of 10 per cent. of water. (4) That calcium sulphide, in the absence of moisture, is totally inert towards carbon disulphide. In summing up, his words are: "The presence of a trace of water produces an effect precisely similar to that of heat energy in inducing the combination of substances which, under otherwise similar conditions, are practically inert towards one another."

In view of these facts, I am of the opinion that the deleterious effects of a low temperature on a lime purifier (and, it may be, also on an oxide purifier) arise from the solidification of the water and the consequent withdrawing of its solvent properties. Nor must I omit to notice the condensation of moisture from the gas before it reaches the purifiers. I am also inclined towards the opinion that, under such conditions, sulphur is allowed to pass both as sulphureted hydrogen and an excessive proportion of carbon disulphide. For, in addition to the fact that these and carbon dioxide will not be arrested by a frozen purifier, it has been proved that, under certain conditions, the partially fouled lime will be decomposed, carbon dioxide setting free both carbon disulphide and sulphureted hydrogen, sulphureted hydrogen setting free carbon disulphide, and *vice versa*.

1. Since writing this paper I have made a few experiments in desiccating the gas by passing it through sulphuric acid and calcium chloride, and the effect has been to demonstrate that the mixture is a potent factor in purification. These later experiments have only been made with oxide so far.

The question now naturally arises: How then to account for the presence of sulphureted hydrogen in the holder and mains and not at the purifiers? To this puzzle I would suggest the following solution: Our coldest hours are between midnight and 6 A.M., and often these hours are our busiest in making gas. I deem it more than a possibility that during such hours the requisite quantity of heat and moisture may be withdrawn from both the gas and the purifiers, and volumes of impurity may be allowed to pass into the holder. The warmer hours of the day will witness the revival of the purifiers, so that a superintendent may make his tests and pronounce "all right," not knowing that in the *chill* watches of the night his sentinels have been benumbed and have been allowing the enemies to pass.

In conclusion I will reiterate the advice to maintain a moderate temperature in the purifying house, and to that I will add, provide a telltale of some kind that will inform you what your purifiers were doing while you were asleep.

Table of Experiments.

No.	Purifying Material.	Weight Used.	Temperature.	Duration of Experiment.	Volume Purified.	Cu. Inch per Min.
1	Oxide	28 oz.	57°–73°	7 h. 16 m.	25′ 320″	100.
2	Oxide	28 oz.	6°–20°	0 m.	1′ 377″	91.5
3	Oxide	28 oz.	56°–81°	93 h. 30 m.	92′ 735″	28 47
4	Oxide*	28 oz.	0°–20°	22 h. 58 m.	20′ 237″	25 25
5	Lime†	12 oz. slaked.	6°–18°	13 h. 12 m.	14′ 735″	31.47
6	Lime	12 oz. slaked.	62°–72°	9 h. 3 m.	10′ 397″	32.46
7	Lime	5 oz. dry. 9 oz. slak'd	67°–74°	6 h. 53 m.	9′ 864″	39 75
8	Lime‡	5 oz. dry. 9 oz. slak'd	8°–14°	4 h. 57 m.	3′ 1092″	21.13

* Revived on heating.
† Purified 4′ additional after heating.
‡ Diaphragm partly stopped. Purified 1′ 1033″ at the rate of 30.7″ per min. after heating.

Discussion.

Mr. Russell—I would like to ask Mr. Ferrier what kind of gas that experiment was made with.

Mr. Ferrier—With coal gas entirely.

Mr. Russell—Had it gone through the condenser and scrubber before you made the experiment?

Mr. Ferrier—Yes. It was taken just before entering the purifying house, and after it had passed the condenser and scrubber.

Mr. Russell—What temperature did you have there when you collected that gas?

Mr. Ferrier—Do you mean before it entered the U tubes?

Mr. Russell—Yes.

Mr. Ferrier—The atmospheric temperature in the experiments ran from 57° to 74°. That was the temperature of the gas before it reached the U tubes, in our climate.

Mr. Russell—Did your desiccation take place before the gas entered the holder? You said you used the holder to collect the gas.

Mr. Ferrier—The gas entered the holder after it had passed through the U tubes, the purifier and the indicator. It was simply collected, after passing through the entire apparatus, in the meter prover. The reason I used the meter prover in preference to the test meter is that the latter is not always reliable in passing gas slowly, and, in addition to that, there is a little variation in rate which sometimes interfered with my experiments to a certain extent. So I kept the same pressure all the time by means of the meter prover.

Mr. Russell—Was the lime you used rock or shell lime?

Mr. Ferrier—It was rock lime.

Mr. Thompson—One of the queries in our question box has reference to the use of the Dexter process in connection with purification—by introducing a portion of the exhaust steam into the purifiers to supply the moisture necessary to maintain revivification. I infer, from the absence of any reference to it in Mr. Ferrier's remarks, that he has not tried that process. Mr. Sheard, in his monograph on oxide of iron, in the London *Journal of Gas Lighting* of last August, has remarked that the introduction of exhaust steam accomplishes two offices, one of which is the prevention of caking of the oxide, and consequently back pressure, by providing moisture; and the other being the prevention of caking through checking the possible local fusion of sulphur. He goes on to state that since the melting point of sulphur is but 236°, that where we know the temperature sometimes rises high enough to volatilize the moisture present, it is not difficult to suppose that you may raise the temperature locally sufficiently high to also fuse the sulphur. In connection with Mr. Ferrier's "wrinkle" with regard to the use of the test, I may say that we have employed a suggestion, made by Mr. Thomas Turner some years ago before the American Gas Light Association, using a pet cock at the meter, and testing the gas there, in addition to testing it upon the purifier itself; so that there will be no danger of leak at the center seal, or of any portion of the gas passing through material which might have become foul but not yet hardened, which would not be detected at that point. I would ask that the question with reference to the Dexter process be presented in connection with this discussion.

The President—It might be well to take that up at the present time.

The Secretary—The question referred to by Mr. Thompson is this: "What works in this country are employing the Dexter process of admitting exhaust steam with their air for revivification; and what results are being obtained with it?"

The President—That question will come right along in connection with this paper, and may be discussed at the same time; so that the paper of Mr. Ferrier and this question are both before you.

Mr. Ferrier—The question refers more to revivification. I have not seen Mr. Sheard's paper, referred to by Mr. Thompson, but from some experiments I have made I should thoroughly agree with him as to the use of steam near the inlet of the purifier. I would not admit too much steam and incur the danger of forming naphthaline; but that a certain amount of moisture is essential I am convinced. I placed a sulphuric acid desiccator so that the gas would pass through it before reaching the purifier, and soon the purifier ceased to act. I removed the desiccator and allowed the gas to pass directly and without desiccating, and found that my purifier resumed action. I did not obtain quite such distinct results with calcium chloride as I did with sulphuric acid, possibly because the calcium chloride was not as pure as it should be. I should be inclined to put the moisture into the gas a little before it reached the purifier. I would not approve of putting a very high heat by means of steam into the purifier itself, and for this reason. We have in an oxide purifier a solution of sulphur in carbon sulphide, and the effect of high heat would be to evaporate the solution, volatilizing carbon disulphide and leaving sulphur behind. So that high heats have sometimes caused considerable impurity to go into the gas. Therefore I think it would be better to inject the steam a short distance before the inlet of the purifier.

Mr. Thompson—Has Mr. Ferrier made any experiments, or had any experience of his own, to ascertain what temperature would be required to be maintained, or above which it would be dangerous to permit purifiers to go? I mean with reference to the decomposition of bisulphide.

Mr. Ferrier—I have made no experiments myself, but think that an excessive temperature in the purifying house would impair the efficiency of the purifiers. You must remember that one reason why I made a correction in the text is that the solvent property with water, of certain substances which are in the purifiers, rises with a low temperature, although it almost ceases when actual freezing takes place, so I would not advise an excessive temperature in the purifying house.

Mr. Russell—I would like to ask Mr. Thompson if he does not consider that the use of exhaust steam at the inlet of the purifiers is a very bad thing in the use of oxide. We all know that exhaust steam carries a good deal of oily matter with it, and we know that our oxide friends here like to keep the oil out as much as possible.

Mr. Thompson—Replying to Mr. Russell's question, I will say I cannot imagine that sufficient oil would be carried through to effect any injurious action upon the oxide. I do not speak from theory, but from practice. I have employed exhaust steam for more than a year at our works with a great deal of success, and it was the object of the question with regard to the Dexter process to ascertain for Mr. Dexter himself what other works in this country were employing it. Columbus, Ohio, and St. Louis, Missouri, employ it; but I am not informed as to other instances. Mr. Butterworth and myself have been in correspondence with Mr. Dexter, and it was at his request that this question was introduced. I have no hesitation in saying that the use of exhaust steam is not attended with any such difficulty from the oil as Mr. Russell suggests.

Mr. Butterworth—Mr. Sherman informs me that the process is also being used at Newark, N. J., and with great success.

Mr. Mather—With regard to that, Mr. Vanderpool introduces 1 per cent. of air, and what he calls about a quarter turn of steam into the inlet to his purifier; and he gets in the winter time 35,000 feet per bushel of oxide; in the spring 45,000; and in the summer 55,000. That is, making 45 per cent. of coal gas during the year.

Mr. Harper—I would like to ask Mr. Ferrier with regard to his method of determinations. He said these were made from time to time. I would ask at what stages in the process those were made—whether before or after the gas had passed through the filter?

Mr. Ferrier—Some of the experiments lasted for a considerable time, one for 93 hours. I cannot say I made them exactly before and after.

At certain times during the experiments I would make a determination of the gas to find out if any excessive changes were taking place. I also watched the scrubber to see how it was running, and to see if everything was uniform. That was all I did.

Mr. Mather—I would add to my statement that his temperature is considerably higher than I understand most gas men pass the gas into the oxide. It varies from 90° to 110° F.

Mr. Butterworth—I will briefly state our results at Columbus with the Dexter process. We introduce live steam at the inlet to the center seal. The reason we do not introduce exhaust steam is because we utilize it in heating water for the boilers, and it is not worth while to take it away from that use. We began this process about the 1st of April, 1893. For the year following this date we emptied and refilled only about half as many boxes as we had emptied and refilled the previous year—with the same amount of gas and the same kind of coal.

Mr. Dunbar—I have been using exhaust steam for 8 or 9 months. I introduce it into the main, about 20 feet from the first purifier, and I find that the oxide does not cake. Changing the purifier previous to that time had been necessitated by the caking of the oxide. I also find that when introducing the steam in that way the back pressure does not increase.

The President—If there is no further discussion desired on this subject, I have pleasure in saying that the Association is under obligation to Mr. Ferrier for his paper, and for the time and attention he has given to the subject. Is the Committee on President's Address ready to report?

Mr. Chollar, at the request of Mr. Baxter, Chairman of the Committee, read the following report :

Report of Committee on President's Address.

Your committee to whom was referred the very excellent address of the President have had the matter under consideration and beg leave to report as follows :

We commend the address in its entirety to careful consideration, but especially desire to call your attention to a few points and clauses.

In regard to the question of municipal control of gas works we believe, with the President, that gas companies who conduct their affairs on sound business principles and keep their property in good condition, can make and sell gas at a lower price than if the same service were rendered under municipal control ; but the question is liable to arise at any moment, and every company should be prepared to meet it. The question is a local issue and must he engaged in by each company single-handled and alone. The clamor is based upon human depravity ; and the average shouter for municipal control thinks somebody is making too much profit, and at equal prices would prefer patronizing a municipality at a greater, to a private corporation at a smaller profit.

We recommend, as suggested by the President, the appointment of a commission whose duty shall be to gather such information as they may be able to obtain in regard to the cost of manufacture and distribution of gas in various cities ; such information to be for the benefit of the members of this Association for use in combating obnoxious enterprises and for spurring themselves to increased activity. We concur with the President in the opinion that the successful introduction of gas stoves and gas appliances requires persistent hard work and continued effort, and commend to the particular attention of our members that part of the address which speaks of this matter.

Your committee further recommend that substantial assistance be given to street railway companies for the purposes of encouraging the use of gas in their motor cars, with a view of securing increased business and at the same time diminishing the chance of injury to our mains and services.

In regard to "federation," it is the opinion of your committee that such a thing is desirable to the extent of providing a means for the doubling up of Association teams, for pulling through and overcoming difficulties too great for each Association alone, but we strongly believe that each Association should jealously keep and maintain its own teams, harness and drivers.

Respectfully submitted,

I. C. Baxter,
Jas. Somerville,
B. E. Chollar,
} Committee.

On motion of Mr. Cowdery the report was accepted.

Announcements from Mr. Greenough.

The President—I have the pleasure of introducing Mr. Greenough, who has some announcements to make.

Mr. Greenough—The first matter I wish to call your attention to is the fact that the dinner which we are to have the pleasure of offering you to-night will take place punctually at 7 o'clock. The gentlemen will please come together in the large hall down stairs between half-past six and that time. The doors of the dining room will be thrown open at seven o'clock, sharp. It has very often happened at our meetings, as you all know, that the dinner has been delayed on account of the difficulty of getting the large dining hall ; but it is to be given to us to night punctually at seven o'clock. The President has said that there are a number of gentlemen who would like to visit the gas works this afternoon, and I have arranged to have two electric cars ready for your use at three o'clock sharp. They will be in the Square, and as soon as you gentlemen get together at the door of the hotel they will come up here, and will take you down to within five minutes' walk of the works. There are a number of gentlemen here who have brought their wives or daughters with them to the meeting, and arrangements have been made to entertain so many of them as would like to go, at the theater this evening. Seats have been procured, and if the ladies will meet in the small reception room, at half-past seven, an escort will be provided to take them to the theater and see them properly established in their seats.

Report of Committee on Introduction of Visitors.

The President—We will now have the report from the Committee on the Introduction of Visitors.

Mr. Sellers—We have with us as visitors Messrs. C. H. Nettleton and W. H. Pearson, of the American Association, and Messrs. W.W. Cantine, F. J. Davis, F. C. Snerman and J. D. Howell, of the Ohio Association. I take pleasure in presenting them to the Association.

The President—The gentlemen whose names have been given will consider themselves as thoroughly introduced to our members, and made welcome to our meetings.

Election of New Members.

The Committee on Applications for Membership recommended for election to active and associate membership the gentlemen named below. The Secretary was instructed to cast the ballot of the Association for their election, and they were declared duly elected to membership and welcomed to the Association.

Active.

Cardell, J. H., Supt. Gas Light Co., Memphis, Tenn.
Fitch, Henry D., Gen. Manager Bowling Green (Ky.) Gas Lt. Co.
Fullerton, Geo., Jr., Asst. Supt. Buffalo (N.Y.) Mutual Gas Lt. Co.
Goldsmith, Wm. G., Asst Secy. Gas Light Co., Detroit, Mich.
Harris, Wm. M., Asst. Supt., Mansfield (O.) Gas Lt. Co.
Hathaway, E. C., Supt. Capital Gas and Elec. Lt. Co., Frankfort, Ky.
Holmes, B. P., Gen. Manager Youngstown (O.) Gas Co.
Hill, Wm. H., Supt. Erie (Pa.) Gas Co.
Hyde, Eugene A., Sec. and Supt. Ravenna (O.) Gas and Elec. Lt. Co.
Knight, J. J., Gen. Manager Kalamazoo (Mich.) Gas Lt. Co.
Logan, John D., Vice-Pres. Newton Gas Co., Whitestone, L. I.
Lynn, John R., Sec. and Supt. Penn Yan (N.Y.) Gas Lt. Co.
Nash, A. F., Sec. and Treas. Windsor (Ont.) Gas Co.
Paige, Carter W., Jr., Asst. Supt. Gate City Gas Lt. Co., Atlanta, Ga., 813 Drexel Bdg., Phila., Pa.
Powell, W. E., Supt. Logansport (Ind.) Gas Lt. and Power Co.
Salter, James, Supt. Covington (Ky.) Gas Lt. Co.
Slater, A. B., Jr., Supt. Providence (R. I.) Gas Co.
Westcott, J. F., Consulting Engineer Belleville (Ont.) Gas Co., Toronto, Ont.

Associate.

Callender, Elbert P., Am. Gas Light Journal, New York city.
Gardner, James, Jr., Mfr. Firebrick Material and Retorts, Pittsburgh, Pa.
Gassett, A. L., with The Schneider & Trenkamp Co., Cleveland, O.
Hinman, C. W., Meter Mfr., Bostou, Mass.
Isbell, Charles W., Mfr. Gas Apparatus, New York city.
Mather, Henry A., Greenpoint Chemical Works, Greenpoint ave. and Newtown Creek, Brooklyn, N.Y.
Page, Albion L., Mfr. Gas Apparatus, 69 Wall street, New York city.
Stacey, James E., Agent Stacey Mfg. Co., Cincinnati, O.
Wilke, F. A., Mfr. Wilke China Kiln, Richmond, Ind.
Wilkins, John T., Engineer Connersville (Ind.) Blower Co.
Young, A. W., Youghiogeny Gas Coal Co., Pittsburgh, Pa.

Place of Next Meeting.

Mr. Cowdery—Your Committee appointed to select the place for holding the next meeting of the Association adopted the policy of seeking no invitations, believing that the Association has a perfect right to go to any city in the Union it may desire to visit, without regard to the wishes

of the residents of that city. After canvassing the situation thoroughly, and having in mind every city from New Orleans to Minneapolis, and from Pittsburgh to Denver, it was the unanimous choice of the Committee, on the first ballot, that Pittsburgh be selected as the place of the next annual meeting. Accordingly your Committee recommend that Pittsburgh be selected for the next meeting.

On motion of Mr. Lansden the report was received and adopted, and Pittsburgh was selected as the place for the next meeting.

RESOLUTIONS RESPECTING THE RETIREMENT OF SECRETARY LITTLETON.

The President—Is the Committee on Resolutions, with regard to the retirement of our Secretary, ready to report?

Mr. Howard—Your committee presents the following report:

Whereas It appears from the report of the committee on nomination of officers that our Secretary, Mr. A. W. Littleton, persists in declining to again accept the office;

Resolved, That the Association hereby expresses its sincere regret at this determination, and desires to place upon record its high appreciation of the able and efficient manner in which he has discharged the important and burdensome duties of the position, his unfailing courtesy, his kindly regard for the interests of the individual members, and his valuable service rendered without regard to his personal convenience or private interest, especially during the trying period of the early history of the Association, and which have placed us all under lasting obligations. We trust that, relieved from the care of this office, he may long continue his interest and activity in behalf of the Western Gas Association.

J. B. HOWARD,
B. E. CHOLLAR,
C. R. FABEN, JR., } Committee.

On motion of Mr. Dunbar the report was received and recorded on the minutes.

Secretary Littleton—Mr. President and Gentlemen: I wish to thank the committee, and the Association, for the very kind words in which they have been pleased to refer to my past services as Secretary. Although severing my connection with that office, I wish to assure the Association that I intend to be just as loyal to its interests in the future as I have endeavored to be in the past; and shall always be glad to help it in any way I can.

Mr. Howard—The committee desire me to state that if it were attempted to put into print or upon paper their appreciation of the merits of our Secretary we do not think the hotel could supply them with sufficient paper; and so we have confined our report to a few words, intending to give only the pith. It is not necessary to allude in greater detail to the services of our worthy Secretary. He has been in that office for the past twelve years; and his work speaks for him. He has grown up with the Association, and grown not only in strength and in physique, but in our love—for who is there that doesn't like Littleton? (Applause).

CHANGE OF MEMBERSHIP.

The Secretary—I have applications from Mr. N. A. McClary and Mr. E. E. Morrell, who were elected some years ago to Associate Membership, but since that time have become eligible to Active Membership, for a change from Associate to Active Membership. Mr. McClary is now the President of the Cicero (Ills.) Gas Company, and Mr. Morrell is its Engineer and Superintendent. According to our By-laws we have no means of making this transfer except by referring the matter to the Association, and it can authorize the Secretary to make the transfer. That has been the custom in the past.

On motion of Mr. McDonald the gentlemen named were transferred from the Associate to the Active list.

IN MEMORIAM.

Mr. Lansden, of the committee appointed to prepare notices of deceased members, presented the following resolutions, which were, on motion of Mr. Odiorne, adopted:

Resolved, That in the death of Peter E. DeMill, Jr., this Association has lost one of its most enthusiastic and honored members; one who, it might be said, was born to the gas business, as his father was for many years the Secretary of the old Detroit Gas Light Company; and from his early boyhood, young DeMill was pleased to consider himself a champion of the industry we represent—a genial, social, generous spirit, whom we all mourn.

Let us place a garland on his last resting place, and while we mourn with his friends and the surviving members of his family, we can comfort them with the assurance of our esteem and appreciation of his many virtues. After them, he was our brother.

Resolved, That a copy of this resolution be sent to his sisters by the Secretary of this Association.

T. G. LANSDEN,
F. W. FREESE,
W. M. EATON, } Committee.

ROLL CALL.

Upon the call of the roll the following members were reported as in attendance:

Honorary Members.

Slater, A. B., Providence, R. I.
Harbison, J. P., Hartford, Conn.
White, Wm. H., New York City.
Humphreys, C. J. R., Lawrence, Mass
Leach, H. B., Taunton, Mass.
Barker, F. E., Boston, Mass.

Active.

Averill, G. M., Cedar Rapids, Ia.
Baxter, I. C., Detroit, Mich.
Beal, W. R., New York City.
Blodget, C. W., Brooklyn, N. Y.
Brown, W. L., Evanston, Ills.
Butterworth, Irvin, Columbus, O.
Chollar, B. E., St. Louis, Mo.
Christie, W. H., Corning, N. Y.
Clark, Walton, Phila., Pa.
Copley, I. C., Aurora, Ills.
Corley, J. A., Owensboro, Ky.
Corscot, John, Madison, Wis.
Cowdery, E. G., Milwaukee, Wis.
Cowdery, R. E., Topeka, Kansas.
Croul, J., Detroit, Mich.
Darrah, S. M., Wheeling, W. Va.
Douglas, H. W., Ann Arbor, Mich.
Dunbar, J. W., New Albany, Ind.
Dunlap, H., Emporia, Kan.
Dunlevy, H. H., Wheeling, W. Va.
Eaton, W. M., Jackson, Mich.
Evans, C. H., Chicago, Ills.
Faben, C. R., Jr., Toledo, Ohio.
Ferrier, J., Columbus, Ga.
Freese, F. W., LaPorte, Ind.
Fullagar, W. E., Port Jervis, N. Y.
Greenough, M. S., Cleveland, O.
Gwynn, Jos., Steubenville, O.
Harper, G. H., Altoona, Pa.
Harris, G. S., Mansfield, Ohio.
Highlands, S. M., Clinton, Ia.
Howard, J. B., Galena, Ills.
Hyde, G. A., Cleveland, Ohio.
Hyde, H. H., East Saginaw, Mich.
Jenkins, E. H., Columbus, Ga.
Jones, C. D., Independence, Ia.
Kellar, C. M., Columbus, Ind.
Knight, C. S., Fort Wayne, Ind.
Lansden, T. G., Washington, D.C.
Light, George, Dayton, O.
Lindsley, E., Cleveland, O.
Littleton, A. W., Quincy, Ills.
Lynn, J. T., Detroit, Mich.
McDonald, W., Albany, N. Y.
Malin, H. A., Joplin, Mo.
Miller, C. R., Pittsburgh, Pa.
Morgans, W. H., Pontiac, Mich.
Murdock, J. W., Ottawa., Ills.
Odiorne, W. H., Springfield, Ills.
Penn, J., Washington C. H., O.
Perkins, B. W., South Bend, Ind.
Printz, E., Zanesville, O.
Ramsdell, G. G., Phila. Pa.
Raynor, C. H., Adrian, Mich.
Russell, C. P., Brooklyn, N. Y.
Sellers, W. B., Covington, Ky.
Shelton, F. H., Philadelphia, Pa.
Small, J. C., Aurora, Ind.
Soden, W. T., Emporia, Kan.
Somerville, J., Indianapolis, Ind.
Steinwedell, W., Quincy, Ills.
Stratton, R. J., Decatur, Ills.
Tayler, G. H., Warren, O.
Thompson, G. T., St. Louis, Mo.
Ward, B. A., Michigan City, Ind.
Warmington, D. R., Cleveland, O.
Wilkiemeyer, H., Evansville, Ind.
Young, J., Allegheny City, Pa.
Young, R., Allegheny City, Pa.

Associate Members.

Adams, C. F., Chicago, Ills.
Bissell, W. G., Chicago, Ills.
Bredel, F., Milwaukee, Wis.
Brown, E. C., New York City.
Buss, J., New York City.
Cressler, A. D., Fort Wayne, Ind.
Dell, J., St. Louis, Mo.
Dickey, P. S., Chicago, Ills.
Felt, H., Jr., Cincinnati, O.
Goodwin, W. W., Philadelphia, Pa.
Gribbel, J., New York City.
Guldlin, O. N., Fort Wayne, Ind.
Harper, H. D., Chicago, Ills.
Hauk, C. D., Chicago, Ills.
Hayward, S. F., New York City.
Helme, W. E., Philadelphia, Pa.
Higgins, C. M., New York City.
Keeler, H. E., Chicago, Ills.
Kendall, J. R., Terre Haute, Ind.
Logan, W. J., New York City.
Loomis, B., Hartford, Conn.
McClary, N. A., Chicago, Ills.
McIlhenny, J., Philadelphia, Pa.
Mayer, J. F., Baltimore, Md.
Morrell, E. E., Chicago, Ills.
Moses, F. D., Chicago, Ills.
Osius, G., Detroit, Mich.
Persons, F. R., New York City.
Prentice, A. T., Chicago, Ills.
Randle, C. H., Chicago, Ills.
Roots, D. T., Connersville, Ind.
Roper, G. D., Rockford, Ills.
Russell, D. R., St. Louis, Mo.
Stout, J., Chicago, Ills.
Stratton, S. S., Chicago, Ills.
Van Wie, E. G., Chicago, Ills.
Waugh, F., Chicago, Ills.
Weber, O. B., New York City.
Wickham, L., St. Louis, Mo.

The President—Yesterday afternoon the Committee on Nomination of Officers made their report, and we elected officers for the ensuing year. For some reason the officers elected have been in hiding ever since, but we have finally got them here, and we would like to have a word from them as to whether they will take the offices to which they have been elected. I will first call upon Mr. I. C. Baxter, of Detroit, the President-elect.

Mr. Baxter—Gentlemen of the Western Association : I thank you for the honor you have conferred upon me by electing me to this position. With the assistance and co-operation of the officers and members I shall endeavor to do my duty as your President. Again I thank you.

The President—We will hear from the First Vice-President, Mr. W. H. Odiorne, of Springfield, Ills.

Mr. Odiorne—I thank you very heartily for the honor you have conferred upon me, and I assure you I will endeavor to do my duty as far as my ability goes.

The President—Mr. S. M. Highlands, the Second Vice-President-elect, does not seem to be present. We will hear from the Secretary-elect, Mr. J. W. Dunbar, of New Albany, Indiana.

Mr. Dunbar—Mr. President and Gentlemen : I assure you I am appreciative of the honor, and also of the responsibilities and duties of the office to which you have called me, and which have been so faithfully and earnestly performed by our retiring Secretary. I shall endeavor to perform those duties faithfully, and hope to be able to do so in a manner that will be satisfactory to all of you. I can hardly expect to do so well as our Secretary has done ; but with your assistance I hope that our meetings may be made as successful in the future as they have been in the past. I thank you for the honor.

The President—The next thing before the Association will be the reading of the paper by Mr. Wilkiemeyer, of Evansville, Ind. I will state that Mr. Wilkiemeyer was called on for this paper at the eleventh hour, and had but a very short time in which to prepare it. The paper itself needs no apology, but we are under obligation to him for undertaking to write it at such a late date.

Mr. Wilkiemeyer then read the following paper on

THE BEST METHOD OF INTRODUCING GAS STOVES.

No truer truth was ever told than that "Every dog has his day." The invention and incomparable utility of to-day to-morrow becomes an antiquated specimen of a by-gone age. Time, which is the great changer of all things, in its mutations has affected every phase of human existence, both political and domestic. The march of civilization has in no way made such giant strides as in our common, everyday domestic economy.

Our warlike forefathers waged bloody and brutal battle with the club and stone. Their grandchildren used the spear and sped the deadly arrow from the springing bow. Their offspring in their turn used the battle axe and battering ram. Awkward engines of war were from time to time invented and took the place of their more crude predecessors. Finally gunpowder revolutionized and changed the whole mode of war, and it, too, as a power, sees its decadence in plain sight before the forward march and the encroaching genius of the great electric magicians of our productive century. Before the bells toll the death of 1899, the great explosive, gunpowder, will be relegated as an engine of destruction in a promiscuous heap of cast off war clubs and tomahawks.

The first drinking cup was the hollow of old Adam's hand, and the sparkling spring water of Eden was carried to his lips with as refreshing effect as the *bon vivant* quaffs his vintage of Tokay.

As man's habits became less predatory and his habitation fixed, as he learned to utilize the cattle that first came under the dominion of man, his drinking cup was a cow horn stuck in the ground. After tables came into use he cut off the point of the horn and bottomed it with wood or leather. He finally learned the use of common clay, and ere long discarded the chip plate and the horn cup for the lovely products of Dresden and Limoge.

Our father Adam and our mother Eve were clad in aprons made from the broad leaves of the forests. Their early sons were clad in the untanned skins of wild beasts. The dwellers in some sunny clime, driven by necessity, the great mother of all our progress, discovered the fibrous bark of certain trees, and wool and hemp were for centuries the only coverings of our developing race. Then came King Cotton with gay calico, and now we all feel best in broadcloth and delight to see our wives and daughters clad in finest silks and softest satins, products of the skillful weavers of the world.

When man first went to housekeeping his establishment was all of a piece, primitive and simple. He sought some thick-leaved tree or overhanging rock to shelter the heads of himself and his family from the raging storm. On the prairie, where Nature was not so beneficent, he stuck a pole in the ground and over it stretched the hide of some conquest of the chase, or with his stone axe, in the primeval forest, he hacked down a few poles and erected a mansion of wood. With further development in the ever revolving progress of time he dwelt in houses of stone and sun dried brick ; and now steel and iron, and marble brought from across the seas, contribute to the erection of the modern palaces which grace our most magnificent municipalities.

Our first cabin, dark at night, was rendered habitable in the day by an open hole in its wall, through which the wild and wintry wind had free passage ; then, greased paper let in the light and kept out the wind and rain. But now who but has his plate glass front in windows of house and store.

The man who lived and had his being early in the world had little chance to learn anything of this footstool except of the small and circumscribed locality in which fate had settled him. If he listed to travel by land he must walk or ride some animal ; if by sea or water, the slow and toilsome oar, or dangerous sail, was all his motive power. But now, in pace with modern progress, he travels in a single month the journey which in the olden days would have required the span of a long and active life. He circles the world in a flash and skims across the seas with the speed of a swallow.

For countless ages the learning of the world was locked in the possession of a sacred few. Knowledge, which was and always will be power, was a closely guarded and jealously kept secret. The rolls of papyrus containing the secrets of the ancients and the foundations of the philosophies of the world were but for the few and favored. Books were hoarded as the miser hoards his gold, and the great storehouse of universal knowledge was barred and barricaded to the world. But now education is universal. Books are in reach of all, and every day for the pitiful sum of a single penny you may learn of every current item of human interest in the whole world. Great journals printed over night contain the daily record of important happening of the world. Whole libraries that cannot be read and digested in a week are turned out every 24 hours, and their information is within the reach of all who desire it, for a nickel. What the kings and the queens of the old world are doing, who they have married or intend to marry, what congresses and parliaments contemplate, new inventions, policies of nations, new discoveries of science, new productions in art, sins committed, scandal exposed, wars, fevers, trials, treaties, policies, both private and public, you may read of for a cent.

Great colleges open wide their doors to the youth of the land almost without price, and learning, useful, profound or superficial, is actually within reach of all who wish it.

While our ancestors were, by toiling "from early morn to dewy eve," from the breaking up of winter to full planting time, scratching up a few acres with their wooden mold boards ; while the whole winter was occupied in flailing out the garnered grain, we now see the steel share driven at lightning speed across broad acres, and machinery of various kinds doing farm work in a single day that was once the work of months. "The weary plowman" is now a thing of the past, and the "agriculturist" sits on his sulky plow and rides at ease during his whole day's work.

The first men survived on raw meat, herbs and roots, but the modern stomach has been educated to the necessity of more elaborate culinary preparations.

"Man may live without poetry, music or art ;
He may live without conscience, or live without heart ;
He may live without friends, he may live without books ;
But civilized man cannot live without cooks."

Good eating, and perforce good cooking, is not only one of the prime luxuries, but is a necessity of life. When we come to consider, fairly and candidly, the pleasures of our existence, the table and its burden is not the least to be considered.

As man has made such wondrous strides of advancement in all other temporal affairs and conveniences of his daily existence, so has he progressed in the science and art of cookery. Books are written on the subject. It has become a recognized science, and some of its eminent professors draw larger salaries than judges and congressmen. Fire (and from fire, heat, and from heat, power) is one of the greatest gifts of God to man. It is related in ancient mythology that early in the ages the secret of fire and of its production was the exclusive property of the gods. Prometheus, a benevolent inhabitant of the skies, gave away the secret of its production to mortals, who were hereto deprived of its incalculable benefits. In punishment for this offence he was condemned to live eternally chained to a rock on a bleak mountain side, where the wild vultures each day devoured his vitals, which each day were renewed. This legend demonstrates the great appreciation in which the ancients held this most useful element.

The dearest wish of a good wife's heart is that her family and her friends may think well of her cooking. And what husband, worthy of the name, does not delight in furnishing her the improved means and conveniences in this, the life-work of many women ?

Labor saving devices are promptly sought for and grasped by man, and his loving helpmate should not be overlooked when it comes to a consideration of such matters.

The open fireplace and the Dutch oven have given place to the modern wood and coal stove; but with even this improvement, what a world of dirt and dust and discomfort is connected. Even as the whole world progresses, so has cooking and the means of cooking progressed, and it is the object of this paper to demonstrate the best, safest and most economical device ever up to this date invented for the convenience of our beloved cooks. And thus, having logically demonstrated to the nicety of a theorem the constant improvement in all material matters, I am brought face to face with the subject of this paper, "Gas stoves and how to teach the people that it is for their interest to use them."

Despite the experience of the past, that present esteemed and appreciated aids and assistants in "the art of living" are constantly giving place to, and improved methods, means and machinery, there is a lingering dread, a sort of half believed auspicion in any new thing. And even though its benefits and advantages may be read by him who runs, and speak out loud enough to reach the ear-drums of all the land from the mountain tops, every new idea must be advertised and electioneered for.

We who are engaged in the manufacture of artificial gas are interested in this matter because it affords an increased field for our operations, an extended market for our commodity. That which is worth our possession is worth striving for, and if we desire to extend our markets, there is an open and accessible field spread plainly before our view. We must constantly show the people the manifold advantages to be gained by an abandonment of that filthy fuel, coal, with its attendant and concomitant evils of dust, ashes, sparks, expense and labor; and the oft demonstrated danger and fatality connected with the use of that most volatile, destructive, treacherous, death dealing, property-destroying compound known as "Gasoline."

It is a well known and patent fact that there is no article or commodity of commerce that "sells itself." While life insurance is a desirable thing and should be taken advantage of by every man with a family, it is not chronicled that any man ever went to an agent and asked to be insured. The farmer must be seen before he sees the economy and the necessity of his purchasing some article of labor saving machinery. The great trunk lines of railway covering this fair land in all directions, all have their agents out to solicit trade and patronage. In fine there is no enterprise, however much of merit there may be in it, that wins success of itself. It must be pushed. It must be advertised. It must be boomed. It must be talked. It must be be *shown*. The common run of humanity have lost much faith in the statements of printers' ink. They by no means are so gullible as to believe all they read. The most eloquent and flamboyant declamation in printed advertisements by no means carry convictions of the truth of the statements. The way to impress a customer is not by vivid word pictures, but by an actual demonstration of the merits of the article offered. The evidence of the eye is much more satisfactory than that of the ear. In law the "eye witness" is the most desirable when it is desired to establish a fact beyond a reasonable doubt.

A personal appeal or interview is always productive of better results than a communication by wire or mail.

I by no means intend to deprecate the value of good and judicious use of the public press. The newspapers of to-day and of the past have been and are active, useful, indispensable agents in the propagation of good ideas, and a proper use of their columns is always productive of the most apparent good results. They are a most necessary means to the end in view. But we cannot depend upon them alone as a medium of advertising a good thing. We must get down to work ourselves. The man who has the interest of his gas plant at heart, and who has an ambition to make an increased market for its product must have the tact and the patience and the knowledge of human nature, and must be able to read character in faces, like the insurance man, the book agent or the projector of any other commodity.

In the first place he must have a thorough knowledge of the science and philosophy of the article sold. He should be able to answer all questions suggested by the ignorance or the acuteness of the prospective buyer. He must be able to show its merits, and to explain away any fancied and chimerical objections to it. No chance to talk gas stoves and to expatiate upon their economy, their cleanliness and their labor saving qualities, should ever pass by unused.

A practical demonstration of the benefits to be obtained by the use of gas stoves always awakens many to a knowledge of their benefits.

On one occasion I secured the services of a baking powder firm, and gave them space, stove and fuel. The cooking was done in front of a plate glass window in full view of the passing public. The long table fitted up with snow white damask, delicate china and shining silver presented a picture of neatness that would have given an appetite to an anchorite. The lady shoppers dropped in and enjoyed an afternoon lunch, gratis. Business men were invited to a substantial noonday meal all cooked upon a gas stove in plain sight. A glazed meter was conveniently placed through which the gas passed, which was easily and with good results explained to all. Some were so impressed with the plain and palpable good results that their orders for a gas stove were given before leaving. Many ladies who manifested an interest in this modern invention and great boon to womankind were called upon the next day, and many sales were thus made. How their addresses were obtained is still a secret, but a sale rarely failed to be made when the prospective purchaser had seen the workings of a gas stove.

We must boldly attack the gasoline stove. It has been demonstrated beyond a doubt that they are certain agents of ultimate death and destruction. It may be a year, it may be six months or a few weeks, but they are sure to "go up."

We do not seek to hide these facts from the public, but on the contrary when the news of a "gasoline" explosion is heard we kindly furnish the local papers with a cut, and in the same column are scattered we read articles on the absolute safety and good results of gas stoves. We must look after these things, be constantly on the alert, always wide awake if we desire to prosper in our business. Selling and pushing gas stoves is a new profession—is one more necessary requisite to a thorough gas man. The superintendent of a gas works, and every one in his office must educate themselves to be salesmen, and not only salesmen, but philosophers as well.

Whenever we sell a gas stove we thereby gain an agent who never tires in talking, and it costs us not a cent. The lady on X street, who has one, so glowingly describes its advantages that her neighbor across the street or around the corner never rests until she, too, becomes an agent and works for us without pay.

Upon whose shoulders do all these manifold duties rest? Whose duty is it to strive to increase the product of our plant and to increase the customers for its product? It is not the stoker or street foreman. It is the general of the gas house army, the man who has been placed at the head of the affairs of the gas company, is the man who must work these schemes, in person or through his lieutenants. That is what he is paid for, and why his services are sought and valued. If he sits in his office and waits, with the daily papers constantly before his eyes or with his cigar in his moth, for the clamoring crowds to rush in for gas stoves, he will wait in vain. Like all other generals he must be up early and late. He must combine the qualties of an army officer, a book agent, an insurance man and a general salesman. He must carry the war into Africa.

There is no gas plant on earth but can produce more than it is selling with its present equipment. His business is to see there is no waste of material or capital. Until every dollar invested is bringing in its full return in cash; until the whole plant is doing all it can do, the investment is a lagging one.

A man active by nature and practice in this particular field of action has a great scope. He knows it to be a fact, and he can prove it, too, that the introduction of gas as a fuel, will bring in a new era of domestic economy, and will not only lighten the burdens, but ameliorate the condition of thousands who are delving in a never-ending fight between danger, death and dirt.

Not only that, but until his plant is selling its product to its full capacity will he be considered up to his business and fulfilling the object of his being.

Discussion.

The President—We have heard a very able paper upon a subject in which we are all interested, and it should be well discussed. Mr. Wilkiemeyer says that "We must carry the war to Africa." I don't know whether he means to carry it to Georgia or not. The matter is before us.

Mr. Howard—I think I will make a start in this discussion by referring to the early introduction of gas stoves. I do not know the exact year gas stoves were first used in the United States, but I can relate a little reminiscence dating back a few years, and so give you an idea of what was done in the city of Brooklyn, N. Y., in the year 1850. I was working there at that time at my trade as gas fitter, and the gas fitters desired to get up a supper, and to have everything cooked, baked and roasted by gas. An Englishman working in the shop, who had not been here over a year, said, "Boys, if you will give me time I will get up a gas stove that will do all the work of cooking for the entire supper required for that evening." Going to work at it, he built a stove that roasted the meats and baked the puddings; and one item was roasted especially well. One of the fitters had a cousin who was a steward on

one of the Collins line of steamers, and this cousin gave the fitter an English rabbit, which English rabbit was roasted by this same stove. Everything was very nice. Another thing specially noticeable with regard to that supper, and especially commented on by the owner of the hotel, was the gravy. It was especially clear and nice, particularly the gravy of the roast mutton, which had none of the brown, burnt appearance so common; and although he could not understand why it was so clear, and without any tinge of brownness, he had to acknowledge that the meat was cooked properly. I will state that that same man (I want to give him the credit for it, for oftentimes it happens that a man does not get credit for what he has done until after he is gone) also got up a small open heating stove, much like those you see to-day, only of different material, in the grate of which he placed broken pumice stone, in pieces the size of your fist, also intermixing with it some asbestos. Many people who did not know anything about the qualities of asbestos wondered how the stuff could make such a fire and still did not burn away. He called it "salamander," thinking he would hold the secret for himself; but in a short time everbody found out what asbestos was. This same man got up what was called the patent socket, used for drop lights and portables. If he had taken a patent out for it he would have become a very wealthy man. He was the first one to get up that socket, and the first one was a piece of cork inserted with a small piece of rubber. He also got up another thing, a patent on which would have been valuable, and that was the rubber bucket for chain pumps. I allude to this to show what a genius he was. The chain pump in those days was simply a chain with round iron rings attached to it. He had the idea of a rubber cup, inverting it, and placing that on the chain instead of the iron ring. He did not care about patenting that, thinking it was of no great value, and thereby again lost money; for after awhile it was patented by a man who made a fortune out of it.

Mr. Evans—We adopted rather a novel method of introducing gas stoves, by distributing circulars to every family on the line of our street mains, offering to give them a gas range free. Of course the object of this circular was to bring possible consumers to the office, where we could explain what we meant by it. Of course we had a "string" to the offer. Our explanation was simply this: If the consumer would pay for $20 worth of gas in advance we would give him a $25 gas range, or, rather, a gas range he could not purchase for less than $25 at retail. Of course they could not understand such an offer. Our explanation was that by the use of $20 worth of gas, having acquired the knowledge of how to use gas properly, they would become permanent consumers. Of course the facts were simply these: They paid for the gas in advance; we had the money to buy the stoves with; we made a profit on that $20 worth of gas sold which was nearly enough to pay for the stove (laughter); and we got a permanent consumer. Perhaps I will modify that a little by saying that it does not cost any more to distribute 200,000 feet of gas than it does to distribute 100,000 cubic feet. In figuring on the cost of gas, in that deal especially, we figured on the cost of the gas in the holder; and our profits accrued on the margin beyond that. As a matter of fact it did bring us in immediate business. On that plan we put out 1,500 gas ranges within three months; and those gas ranges brought us in a consumption of 150,000 feet per day; and as a matter of fact we made $9.40 per thousand profit (laughter)—I mean $9.40 profit on each $20 worth of gas sold; and between that and what the gas ranges cost us was certainly an advertisement that paid us to adopt that system.

The President—The idea is a good one, and I think it has been tried by some others, though not perhaps in exactly the same way. Has any other gentleman any information to offer on this subject?

Mr. Copley—Those who have sold gas stoves in a small way have perhaps acquired some experience and have some information as to the best manner of selling them. The best method of selling gas stoves must necessarily be a personal history with each man—inasmuch as he has probably adopted the plan which to him seemed best, and which has furnished him his experience. I live in a town of 23,000 or 24,000 people. Five years ago, last February, there were not over 12 ranges in use in Aurora. We have now a little over 1,100 in use in the summer, and probably from 400 to 450 in use throughout the year. The policy we adopted from the very start was this—which, with certain modifications which managers must be able to take advantage of as they present themselves, might, I think, be advantageously followed by others. We visited each church society that holds a sociable in its basement, as they do in many cities, or that holds its sociables or suppers at the pastor's house, and gave to each society a range outright. We said to them, "We could not afford to do this with all of you if it were not a matter of business. We have a kindly interest in your association, but still it is a matter of business with us. We want you to take this stove and use it. We want you ladies to see that we are offering you something that you cannot well get along without." We also went to the other organizations of ladies, such as the Woman's Relief Corps, the order of the Eastern Star and the Women's Christian Temperance Union, giving to each of them a range, not a cheap one, but gave them outright the best range we could buy. There are four daily newspapers there and we advertised in each of them. We not only advertised, but we saw to it that our bills amounted to a little more each year for advertising than the newspaper paid us for gas. We have no deadheads on our line. We settled with most of them once a month. The newspapers are constantly mentioning us and our business kindly, and they also take the trouble to mention gasoline explosions, and where no fatal results follow they simply remarked that people had better go and see the Gas Company about it. Of course we see to it, when they call upon us, that all the horrors which have been averted are brought to their attention. We endeavor to sell, instead of a cheap range, a good one in every instance. When a customer comes into our office we tell him in so many words that the best range is for him the cheapest. We ask him how many there are for whom it is proposed to cook. If it is a small family we advise him to buy a stove of moderate size; but if he has a large family we tell him in so many words that he cannot buy a range for $15 which will do the work of a $30 stove. During the first two years we sold our stoves at cost, and gave some away. We lost money on them; but I have yet to find any business that can divert trade from one channel to another without spending both time and money. Since the second year we have been selling stoves at a profit. For example, whenever we are allowed a discount of 40 per cent. by the manufacturers we give a discount of 25 per cent. We frankly tell customers just what the stoves cost us. We say to each hardware dealer, "We don't want you to sell gasoline stoves. If you will sell gas stoves you need have no money invested in the stoves, for we will carry them for you. You know this lady and that lady better than we do. If you can induce her to buy a gas stove you can come over to our office and take that stove for just what it costs us at the factory, and we will pay the freight and deliver it. So that besides the profit that you will get on the stove, you will save freight and cartage." We say the same thing to each gasfitter in town. Consequently we have five plumbing firms in Aurora that are urging their friends to buy gas stoves, because on every $30 gas stove that they can sell they can pick up $5 or $6 with very little trouble. We have the money invested, and we take the trouble to show the customers how to run the stoves. The newspapers are with us in every instance. Anything special we take occasion to arrange for under a contract as special advertising. We take pains with all our customers who have bought stoves to see that their stoves worked satisfactorily, and that they are given proper attention. And above all that, we constantly urge upon our customers the fact that gas stoves are not a toy, but are a necessity, and that the best is the cheapest.

Mr. Cowdery—Unlike one of the previous speakers, I do not agree with him altogether in the words that he used, although I may in his ideas. I think a law can be laid down as to the best method of introducing gas stoves in every city in the country, and it is expressed in a single word—"advertise." In seeking to introduce gas stoves as rapidly as possible in Milwaukee, we have studied the art of advertising, and have devoted all our efforts in that direction—expanding our ideas to embrace new things, picking up novelties in advertising, and doing anything and everything in that line to attract attention. I think that expresses the whole thing—"Advertise."

Mr. Somerville—I would like to ask Mr. Copley, who seems to be very successful in introducing gas stoves, if he makes any difference in the price of gas.

Mr. Copley—We do not. We make a uniform rate of $1.25 per 1,000 feet in Aurora, which is a town of 23,000 people. After canvassing the situation very carefully in our own city we have concluded that it is to the best interest of both the consumer and the company to make but one rate for gas, and to make that uniformly as low as possible.

Mr. Harper—I will mention that in the town with which I am connected we have adopted the plan, both last season and this, of employing a competent cook, who is duly established in the office, and is there employed in baking cakes and pies to illustrate the adaptability of gas stoves for that class of work. Last season we were quite successful in that method, so that we actually made a profit in our stove department; and this year we have started in on exactly the same plan, and have so far been very successful.

Mr. Highlands—In respect to the methods of selling gas stoves, my impression now is that one of the best ways is to find a good gas heating stove. I have looked the market over to the extent of my ability for the last two or three years, but I have not as yet found a gas heating stove

that I can recommend to my customers. We have a great many gas stove manufacturers here, and I think it would be well to call them to our assistance. The gas heating stove that our customers insist upon buying is, first, a stove that they can afford to use; next, a stove such that they can live in the same room that the stove is working in. A stove that must be connected with a flue becomes rather expensive; and one that is run without a flue connection in our vicinity insists upon being the sole occupant of the room. I stand here ready to give any man an order for 100 or 200 heating stoves, if he can give me stoves that will heat the room without wasting the heat that is produced by the gas; something that will be attractive, and at the same time economical. I will solve a part of the question how to sell gas stoves if any manufacturer will give me such a stove.

The President—I hope that the manufacturers will make a note of this, and will see to it that Mr. Highlands gets what he wants.

Mr. Roper—I will refer Mr. Highlands to Donald McDonald, of Louisville, Ky. He can get from him a stove such as he requires, and one which will permit people to live in the room with it. I am not very good at descriptions, but I think that Mr. Wilkiemeyer has been a little bashful in relating his own experience. He has started in on one new scheme which attracts a great deal of attention. I got into Evansville at 11 o'clock at night, and had occasion to pass his store, which was the most brilliantly lighted place in that town. To give you a little description of the room is about all that I can do. In a 3-story building on the principal street in the town, he has the ground floor, the front being filled with two large show windows, in which are exhibits, and a chandelier is in each window. As you enter the door (a large double door) you come in contact with all kind of gas appliances, arranged on both sides of the store. I think he has two rows of stoves—that is, two rows on either side of the room, running back I should say 70 or 80 feet, possibly a little more than that. Then you come to the clerical part of the office. In the center of the room are two or three combination chandeliers. The first one I think is electric light and Welsbach; the next I believe is electric light and gas, and I think the third is electric light and Welsbach. As you go back to the office, the desk comes part way out into the room. He has a palace back of that. There is no obstruction in the way, so that the clerk at the desk, as he is working at his books, can see anybody who enters the door. If the person stops to look at a stove he has an immediate chance to go out and sell it to him. He has, besides the stove, Douglas heaters and Goodwin heaters in operation. Then in front of his counter is an elevator. He uses the three stories as his store. On the second floor I believe he carries supplies, electrical and otherwise, and on the third floor is the meter department. A man who wants to look at a gas engine can be shown one running the elevator in the building, so if a possible purchaser comes in and asks to see a gas engine he immediately starts his elevator, otherwise it don't run. I believe he has the nicest store and storeroom of any gas company I know of. I do not know of anyone, except the Company at Grand Rapids, that has anything like the room that Mr. Wilkiemeyer has. He can describe his palace to you better than I can.

Mr. Lansden—I do not want to question Mr. Highlands' objection to the existing gas heating stoves, but I think it is well not to lay too much stress on it. I don't think we will ever find a successful heater that will not vitiate the air. The perfect combustion of gas makes carbonic acid. How few rooms are arranged to take it all out! The successful heater must always be connected to a flue. I have in my experience found very few places where I could not connect to a flue. There is no process by which you can get heat into a room except by steam or hot water pipes, but that a flue connection must be made. Why should we call upon gas to do something which no one has ever known to be done by anything else? I believe electricity might accomplish it, but in all other processes of heating we know the waste products of combustion should be carried away. I think if Mr. Highlands will talk the matter over quietly with his consumers he will be able to satisfy them that there are stoves in the market which answer all requirements for heating purposes. I do not want to hear the gas stove men recommending gas stoves which do not connect with a flue.

Mr. Cantine—As I understand it the great objection to a flue is that it carries off so large a percentage of the heat. That is the trouble with gas stoves. It is estimated that only about 10 per cent. of the heat is made use of, the balance going off in the flue. If he will use a different kind of flue, that is, make a small flue of sheet iron, and send it down through the floor and underneath it to the flue, he will find he can put his hand on that and let it remain there without being burned. Such a flue will carry off all the offensive odors and everything that would tend to vitiate the atmosphere. It is the only thing that will do it easily, readily and without trouble.

The President—I saw recently a blue print of a gas furnace which was located in the basement of a house, and heated the house very much like other furnaces of that kind do, and I believe it will be quite a success. It will be on the market in a very short time.

Mr. Lansden—A stove that I have is connected immediately with the flue, but the pipe drops 6 inches and then runs straight into and connects with the flue. I can lay my hand on that pipe and hardly feel its warmth. It takes away all the product of combustion.

Mr. Somerville—Of course it would be an ideal thing if we could get rid of the products of combustion; but we must always remember that when we have a number of gas burners burning in our room the products of that combustion are going into the room all the time. We are all using gas in that way, and yet we all look pretty healthy. As I look into the faces of the men around me I cannot see that they indicate any great amount of suffering by reason of living in rooms in which gas has been burned in that way. If that is the case why should we fear to introduce a little stove that will burn only about 12 feet per hour and fear the products of combustion? I see no reason to be afraid of that—considering we are using gas in that way all the time. I think with the usual amount of fresh air that is coming into a room there is no occasion to be afraid to introduce a little stove of that kind for heating purposes.

Mr. Odiorne—Does Mr. Wilkiemeyer make a practice of connecting cooking stoves with the flues?

Mr. Wilkiemeyer—No.

Mr. Odiorne—Not where they are used the year round—winter and summer?

Mr. Wilkiemeyer—I do not know that we have any that are used the year round.

Mr. Copley—I would like to ask Mr. Wilkiemeyer if he has ever found that where he has failed to connect a range with a flue, after a few years, and particularly in cold weather, do not the housewives complain that grease settles on the wainscoting or wall in the vicinity of the back of the stove? We had a case like that. At first we recommended that no one connect with the flue; but after running the stoves for two years we began to have complaints from our customers that grease would settle on the kitchen wall near the stove, and we began to look into the matter (I would like to know if we are right in our conclusions), with the result that we found there was a continual pouring out of vapor from the products of the combustion of gas, which vapor was laden with a little grease, and which settling on the wall finally became noticeable.

Mr. Wilkiemeyer—We have had complaints of it.

Mr. Copley—We have recommended connection with the flue since that, but never did before.

Mr. Murdock—I have had such an experience as that. We put in a connection to the flue, had the kitchen repaired, and had no more bother.

On motion of Mr. Odiorne a vote of thanks was passed to Mr. Wilkiemeyer.

[To be continued.]

Progress of Electricity.

At the opening session of the English Institution of Mechanical Engineers, Professor A. B. W. Kennedy, F.R.S., the President, delivered an address on the "Practical Electrical Problems of the Day." He first dealt with the use of electrical energy for power. As to the transmission of power to a distance, English engineers who wanted to work in this direction would have to study it in other countries. In several towns in the United Kingdom the use of water power for electric lighting would have to be seriously considered some day, but beyond these towns our generation was not likely to see any great development at home.

On the other hand, the question of driving tools in a factory by electricity had recently come to the front. In some establishments the saving by the adoption of electricity seemed practically nil; in others, of large size, where, no doubt, a saving would occur, a considerable amount of capital would have to be spent in making the change. He feared that this would prove a more serious difficulty in the way of the success of the great Niagara scheme than any of those described by Professor Forbes. It was difficult to fix any money value for the convenience of getting rid of the huge mass of shafting, etc., filling the upper half of so many engineers' shops, and the cost of dynamos, leads and motors very greatly exceeded that of shafts and gearing. In cases where electrical energy could be obtained from public mains the comparison was quite different, although it was a question at what rate

electrical companies—liable, as they were, to sudden increases in the demand for light, especially on foggy London days—could afford to supply power for other purposes. In regard to the driving of trains and tramcars, the situation was by no means so favorable to the use of electricity as was sometimes supposed. Only 35 per cent. of the indicated horse power of an electrical locomotive was available for pulling the train, against 80 per cent. in the case of a steam engine. Electricity had forced itself upon the City and South London Railway because of its freedom from foul gases, and in the case of the Liverpool Overhead Railway steam was prohibited. On street tramways probably no form of steam car—even under the Serpollet system—would be generally endured. As to methods of getting the electrical current to the cars, overhead wires might be the best way in country districts, but he hoped that our cities would wait till a practicable underground system had been devised. Meanwhile, electricity was being hard pressed by the cable and compressed gas, of which the latter was far the more formidable rival. Dealing next with the question of public electric lighting, the President observed that the points demanded by the public were that the light should not flicker or go out, that it should be available at all hours, and that it should not be below the declared pressure, nor very much above it. The conditions under which such results were obtained were always varying, and were not only extremely complex in any one place, but were also altogether different in different places. After describing some of the more striking variations he had referred to, he said that some of them came most irregularly and without warning, and all of them very greatly affected both the method and cost of production. When a fog came on, sometimes the work to be done might increase in a few minutes by anything from 500 to 1,000 per cent.

It is improbable that the fuel consumption per horse power in electric light stations could ever reach anything like so low a figure as had often been reached in first-class steamers, where the engines and boilers worked on continuously day and night at pretty much their most economical load. He considered at some length three points relating to the running of a lighting station—security, economy and efficiency of regulation—observing that to some extent the requirements of security and economy were more or less opposed.

Dismissing the use of electricity for physico-chemical processes as outside his own knowledge, he said that nevertheless, from what he did know, he could not doubt that in this direction electricity had a great future. In this section might be included the application of electricity to heating. So many active and competent workers were engaged on this matter that speedy success was greatly to be hoped for. Not only the difficulty of producing the heat, but but also that of producing it in a convenient fashion, had been overcome to a very large extent. The commercial difficulty of producing heat cheaply enough to allow of its general use had not yet been overcome, and until that was done electrical heating, unfortunately, hardly came within practical range, except for very special purposes.

Sacrifice of Heat in Making Producer Gas.

In a paper read before the West of Scotland Iron and Steel Institute, Glasgow, Mr. James Ormiston stated that there is some uncertainty regarding the subject of the loss of heating power in making producer gas. The burning which takes place within the gas producer, and which furnishes all the heat or energy required to change the solid coal to the bulky producer gas, is that burning which results from the partial oxidation of solid carbon. The solid or fixed carbon of the coal, under a limited supply of air, is partially burned, and becomes changed by this burning to the gas we call carbonic oxide. Each unit in weight of carbon is understood to develop by this partial burning an amount of heat equal to 0.3 of what would be developed by its entire burning or complete oxidation.

Of the total weight of the coal, the fixed carbon forms a proportion varying usually from one-half to two-thirds. Combustible matters there are in the coal besides the fixed carbon, but no burning of these matters need take place in the process of making the producer gas. These combustible matters of the coal other than the fixed carbon ought to pass out of the producer, carrying away with them their full heating value. The burning within the gas producer, it will therefore be seen, need only affect with loss of heating power a certain portion of the coal; and, further, the portion so affected by loss need not be deprived in this loss of more than 0.3 of its full heating power—that is to say, the gas producer can be responsible for no more loss than that of a fraction in heating power out of a fraction in weight of the coal.

In the direct burning of coal in the open fire there can be no heat given forth from its volatile matters until heat has been first consumed or rendered latent in expelling these volatile matters. Now, this work of transforming a portion of the solid matter of the coal into a very greatly expanded volume of gases and vapors must consume a certain portion of heat, and a portion great enough to affect, in a way to be felt, such a question as this. The amount of work that is done in this expansion is too great to admit of any other conclusion than this. In the ordinary measurement of the available heating power of coal or carbon this matter of the heat absorbed or becoming latent during any stage of the burning would not require to be taken into account. All that is sought after in such measurements is the net result in heating value of an available kind. The latent heat carried off in the products of the burning does not enter into the question, because it is not available, although the fact still remains that a portion of the heat given out by the coal has nevertheless disappeared in supplying this latent heat.

But the case is different when we have to compare together the heating power of coal and the heating power of a gas produced by the partial burning of that coal, and out of which partial burning, be it marked, there has been supplied the latent heat we have just been considering. We cannot neglect it here if we mean to have a fair comparison. A fair comparison between the coal and its equivalent producer gas there would be obtained by the actual burning of both in equivalent proportions and the measuring of their respective amounts of heat, just as would be done if we were measuring and comparing together the heating power of two different kinds of coal. Instead of making such a fair comparison by experiment as this, it would seem to be customary rather to assume that the heating power of the producer gas is simply the heating power of so much coal after a full deduction has been made from that heating power for all the heat evolved within the producer chamber.

In dealing with latent heat measurements Sir Lowthian Bell has taken a definite value, but on what authority this value rests he does not state. This value which he takes is a sum of 2,000 units of heat for each unit of weight expelled; that is to say, the expelling of 1 unit in weight of volatile matters from coal is accompanied by the absorption, as latent heat, of 2,000 units of heat. Now, the heat given out in the producer by the burning to carbonic oxide of 1 unit in weight of fixed carbon is only 2,400 units. We see, therefore, that if the coal with which the producer is fed should happen to have 1 part of volatile matters for 1 part of fixed carbon, then, according to Sir Lowthian Bell's figures of the heat evolved within the producer, five sixths of the whole sum will not have been wasted at all, but will have been usefully absorbed as latent heat. And, as already pointed out, had the coal been burned without the producer, in any fashion we liked, the result in heat absorption would have been the very same. In such a case as this the real loss of heat chargeable against the producer would only be, then, the fraction of a much smaller fraction than that spoken of. It would, in reality, only be something approaching to $\frac{3}{10}$ of $\frac{1}{4}$ part. And even this small amount would fall to be further reduced by one-half if we assume that the equal weights of volatile matters and fixed carbon of the coal would, upon burning, yield equal amounts of heat.

From the foregoing, then, it would seem that, other things being equal, the best fuel for the gas producer may be that which has the lowest fixed carbon and the highest volatile matters; further, that all sacrifice of heating power within the producer might be done away with if we could feed it with a fuel containing of volatile matters an amount slightly in excess of its fixed carbon.

Another source of heat absorption mentioned in the paper is the evaporation of the natural moisture of the coal. This moisture may be as high as 12 per cent, and as low as 3 or 4 per cent. of the total weight. Four units in weight of moisture will absorb in their evaporation about the same amount of heat as will be given forth in the burning to carbonic oxide of 1 unit in weight of carbon. When the moisture in the coal reaches 10 or 12 per cent. of its weight it will be seen that a further reduction appreciable in amount has to be made from the apparent loss in the producer. The remaining source of this useful heat absorption is the heat of decomposition of moisture in the air which maintains the producer burning. Calculated out, we find that about 1 15th part of the heat evolved in the producer ought to be absorbed in this work of decomposition. That is to say, we have here a further deduction to make from what is usually reckoned producer loss, inasmuch as 1 part in every 15 of the carbon burned to carbonic oxide by the producer has the heat of this burning bottled up without waste, to be again given out when the producer gas is finally consumed. No account is taken here of any possible steam additions to the producer air current. Unless in the case, perhaps, of fuels which have high proportions of fixed carbon, it seems

to be a matter of doubt whether we can do much good, in a heat conserving sense, by making such additions.

In conclusion the author gave figures comparing the heat coal of a representative quality would yield in direct burning with the heat it would yield when indirectly burned as producer gas. From these he showed that Lanarkshire splint coal would lose 10 per cent. of the heating power in burning as producer gas. Examples can easily be multiplied to show the effect on this heat loss, or sacrifice, of using coals of different composition. It is easy to see that, as the fixed carbon of the coal rises in its proportion, the loss calculated in this way would also rise until, in the case of a coke or anthracite fuel, the producer loss might be some 26 or 27 per cent. of the full heating power of such fuel. And, on the other hand, if a coal containing about one-half its weight only of fixed carbon were used, or such a mixture of coal and shale as would give a proportion in fixed carbon of this kind, the producer loss in heating power might be practically nothing or almost nothing. In all the foregoing it is taken for granted that the gas-producer is an instrument so perfected and so managed as to do its work as such work ought to be done. To reason and to found conclusions upon this subject merely in the light of present-day performances in producer gas-making would be to do so prematurely, taking no account of future possibilities.

A New Grinding Material.

M. Henri Moissan has recently described a compound of carbon and boron which is excessively hard, cutting diamonds without difficulty. The compound consists of six atoms of boron combined with one of carbon, and can be formed in several ways. If, for instance, 66 parts of amorphous boron are mixed with 12 parts of sugar carbon and heated in the electric furnace, a reaction takes place between them, and the compound in question is formed. The current used is 250 to 300 amperes at 70 volts, and the reaction takes only 6 or 7 minutes to complete. After cooling the mass in the crucible has a graphitoidal appearance, and exhibits a brilliant fracture when broken. Thus formed, the borocarbide is mixed with much foreign matter, requiring a prolonged treatment with various chemicals to purify it. If, however, the above mixture is, before placing it in the furnace, mixed with 10 times its weight of very pure copper, and then heated, the borocarbide, when formed in the furnace, dissolves in the molten copper, separating out in the crystalline form when cold. By dissolving away the copper by means of nitric acid, a supply of nearly pure crystallized borocarbide is obtained, which can be further purified by treatment with potassium chlorate and nitric and sulphuric acids. Thus prepared, the borocarbide is found to be a black crystalline material of great stability and hardness, having a specific gravity of 2.51. The material burns much less readily than the diamond, and is attacked by very few regeants, the ordinary acids having no effect on it even at a boiling temperature. Its most interesting property is, however, its extreme hardness, which, as already stated, is but little, if any, less than that of the diamond, and this property should render the new material useful for grinding purposes, if it can be prepared at a reasonable price.

The Lighting of Messina.

The Hon. Chas. M. Caughy, who represents the United States as Consul at Messina, in an interesting letter to the Home Department, says:

The present contract for illuminating this city by gas expires on the 28th of March next, but, owing to a deadlock in the municipal council, the Ministry has appointed a commissary, who will act until the organization of a new body in June, and consequently no action will be taken until then. The only illuminating plant in Messina is the gas works owned and operated by an English company under a concession from the Crown in 1861, and which has been once renewed.

The light furnished and the prices charged are both causes of great dissatisfaction to the people of Messina. The power is of only 8 candles, and it costs about $1.92 (gold) per 1,000 cubic feet. It appears to me that there is here a great opportunity for any enterprising electric light company, for in Italy, as well as in the United States, the people are very willing to adopt the latest and best illuminant.

For the installation of a plant for lighting stores and dwellings, and the furnishing of motive power, the prospects are equally favorable. The usual place of abode in Messina, as in the majority of other European cities, is the apartment, or what we know as the "flat." The walls here are never less than 2, sometimes 3 feet thick, and are built of stone, so that the introduction of gas pipes on any floor, except the first, where the connection is made from the street, is attended with so much labor and expense that very few houses, except those recently built, in which it was carried during construction, are provided with it.

No such obstacles confront the introduction through the smallest of apertures, under window jambs, etc., of the tiny electric wire, which can be carried upon arms projecting from the houses, that privilege being now enjoyed by the telephone company, so that one of the largest factors in construction expense, the buying and planting of poles, is avoided.

As to motive power there is one applicant already in the field willing to adopt it as soon as it is installed, and that is the tramway company which runs its lines from Messina to Faro Point, a distance of 9 miles. and to Barcelona a distance of 30 miles. At present the road is operated by dummy engines.

I realize that the first questions that will arise are, what will be the cost of constructing a plant and what will coal cost? When I say that the average price for unskilled labor is 35 cents, and for skilled 45 cents a day; that the laying of stone, including cost of material, is fifty per cent. cheaper than brick; that lumber is no more expensive than in the United States; that land is remarkably cheap and that Cardiff coal costs, delivered on the wharf, $4 per ton, I think the questions are satisfactorily answered.

Before writing this report I made a thorough canvass of the business men of the city, and they, without exception, promised their most earnest co-operation, both with their influence and their purses, to make the installation of an electric plant in Messina a success.

Let me say to those companies who may see fit to enter into competition that they should do so personally, so to speak, by sending a well-equipped representative to look over the ground, and to be on hand to meet any emergency or to answer any question that may arise.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

JUDGE STOVER, in Special Term of the Supreme Court, has appointed Elijah Coffin receiver for the Schenectady (N. Y.) Gas Company.

THE Electrical Association, of Waterbury (Conn.), has placed the contract for its new power station with the Berlin Iron Bridge Company, of East Berlin, Conn. The building will be 66 feet in width and 135 feet in length, the side walls to be of brick and the roof to be covered with the Berlin Iron Bridge Company's patent anti-condensation corrugated iron roof covering.

MR. JOHN R. LIONBERGER died at his home, No. 27 Vandewater Place, St. Louis, Mo., on the morning of May 20th. He was one of the most prominent business men of St. Louis, and was largely interested in the Carondelet Gas Light Company, in which corporation he was a director at the time of his death.

THE constitutionality of the municipal lighting act (1891) of Massachusetts has been upheld by the full bench of the Massachusetts Supreme Court, in the case of the suit of the Citizens Gas Light Company, of Stoneham, against the town of Wakefield. The town, in pursuance of the provisions of the act, at two town meetings voted to establish an electric lighting plant of its own, and the Gas Light Company, having a plant within the town, in the exercise of an option given it by the statute, voted to sell out to the town, and so notified the town authorities. The town refused to accept the plant at the price asked by the Company, and the result was that the present suit was brought by the Gas Company, asking that the town be ordered to buy its property and that commissioners be appointed to fix the sum to be paid. The lower court appointed three commissioners, who have filed their award for about $150,000 in favor of the Company, and against their report objections have been filed by the town and Company and they are still pending. Upon the objections to the constitutionality of the statute the full court says: "It is not a violation of the Constitution of Massachusetts for the Legislature to authorize a town to purchase and maintain either a gas or an electric plant for the purpose of furnishing light to its inhabitants. The Legislature might have authorized cities and towns to erect and maintain such plants without requiring the cities or towns to purchase any existing plant of this kind belonging to private persons or to a corporation, but it has not done so. Under this statute a city or town is not required to establish any such plant, and private persons or corporations are not required to sell to any city or town any existing plant. In this respect there is nothing compulsory in the act, but if a town choose to act under the statute it must act in accordance with its provisions and take the burdens with the benefits. The statute does not provide for a trial by jury upon the value of the property furnished or

upon any of the terms of the purchase. If we assume that when property is taken by a town for a public use the owner of the property has a right to a jury trial, upon the amount of the reasonable compensation to be paid, still Article 15 of the Declaration of Rights has no application to a party who comes in voluntarily under the provisions of a statute which provides for the determination of his rights and obligations in another manner than by a jury trial."

MR. W. H. MILLER, Captain and Assistant Quartermaster, U. S. Army, advertises that sealed proposals, in duplicate, subject to the usual conditions, will be received at the United States Military Academy, West Point, N. Y.. until 12 o'clock noon, on the 20th day of June, for anthracite coal, gas coal, charcoal, gas oil, building materials, plumbing materials, stationery, water and gas pipe, kerosene, tools, plants, glass, and other miscellaneous stores specified on schedules to be had on application.

AS noted before in the JOURNAL, Mr. Alten S. Miller, formerly Western Sales Agent for the United Gas Improvement Company, resigned that position to take the post of Engineer of Works to the East River (N. Y.) Gas Company. Mr. D. J. Collins, who succeeds Mr. Miller, is a brother of the late Mr. Joseph H. Collins, Jr., at one time Assistant General Superintendent of the U. G. I. Company—the immediate predecessor of Mr. Walton Clark, and will be still further remembered as one of the firm of A. O. Granger & Co., the well-known water gas constructing firm of a few years ago, prior to its consolidation with the U. G. I. Company. Another brother (Mr. C. R. Collins) is the Inspector of Manufacturing of the U. G. I. Company. From this it will be seen that Mr. D. J. Collins is of a family who has paid much attention to matters gaseous; further, from his active participation in the old firm of A. O. Granger & Co., he is well equipped practically to take up the work now assigned him, which for its successful manipulation requires skill and tact. His headquarters will be in Chicago, and as he is personally a most estimable man, we have no doubt he will be popular and prosperous.

SUPERINTENDENT E. C. HATHAWAY, of the Capital Gas and Electric Light Company, of Frankfort, Ky., is meeting with much success in his efforts to popularize the use of gas for cooking in that city, the main reason for his success being undoubtedly found in the fact that the rate for gas for this use is only $1 per 1,000. In a circular recently issued by Mr. Hathaway, in which many sensible reasons are advanced as to why Frankfort's housekeepers should favor gaseous fuel for cooking, we notice he falls into the error of stating that gas for fuel purposes is sold in New York City at $1 per 1,000. The fact is that gas for all uses sells in New York at $1.25 per 1,000, wherefore the Frankforters have an advantage of 25 cents per 1,000 over their New York contemporaries.

A "BAY State Gas Man," writing to the JOURNAL, remarks: "The statutes of Massachusetts require that the annual returns of gas and electric companies should be made and filed on or before the second Wednesday of September, and it will be seen, from the report of the Board of Gas and Electric Light Commissioners, that a large number of Companies were reported to the Attorney-General as delinquent, and most, if not all, paid their fines. In a large number of these cases the reports were deposited in the post offices of the several localities on the specified Wednesday, but did not reach Boston until 12 o'clock. It was considered rather small business on the part of the Commissioners to report Companies which had to all intents and purposes complied with the law. Now the Board is under fire, as will be seen from the accompanying inclosure, for a much greater dereliction of duty."

THE enclosure referred to by our correspondent is a daily press report of a hearing had before the Committee on Manufactures of the Massachusetts Legislature, who had summoned before them the Gas and Electric Light Commissioners, for the purpose of inquiring why the Commissioners' report for 1893 had been delayed, the Committee claiming they had been badly hampered in their determinations respecting proposed gas legislation through the failure of the report to come to hand in time. Colonel Wheelwright, Chairman of the Commission, as it seems to us, gave excellent reasons for the delay, the real sum and substance of his explanation being that the Commissioners acted as quickly as it was possible for them to act. During the past year they have been appealed to by at least a score of cities, through the municipal heads of the latter, to order a reduction in the gas rates prevailing in the 20 different places, and as each of these hearings compels the taking of much testimony, offered often at hearings covering several days, almost anyone can determine where a good portion of the time has been put in. If the hearings, however, concluded each case, it would not be so bad, but following the hearing usually comes a minute examination of the books of the Company under consideration, and next a careful sifting of the testimony, so that a verdict fair to the consumer and just to the Company may be reached. After all was said during the catechizing of the Commissioners before the Committee on Manufactures, it seems to us the Commissioners came out of the "investigation" in very good order, and with their position made stronger. It might be also well to remark that the Companies ought to be able to send in their returns even a few days prior to the third Wednesday of September, without any undue hardship to them.

PAPERS incorporating the Wakefield Gas Light Company, of Westchester county, N. Y., have been filed. The Directors named are Messrs. W. H. Smith and G. O. Brott, of New York City, and William McCarthy, of South Mount Vernon, N. Y. The capital is put at $100,000.

IT is said that the yielding gas well on the property of the State Insane Asylum, at Stockton, Cal., is fully up to a flow of 60,000 cubic feet per day, and the Directors of the institution have determined to equip the laundry with apparatus for using the gas for ironing. An attempt will also be made to do the necessary cooking by means of gas.

THE gas rate at Hagerstown, Md., has been reduced to $1.80 per 1,000.

DURING the recent floods in the Juniata Valley the plant of the Huntingdon (Pa.) Gas Company was among the sufferers.

THE franchise of the Asbury Park (N. J.) Gas Company has been renewed. Possibly the proprietors will now determine that it would be a wise thing to extend the main system to the neighboring summer resorts.

THE following notice of an act of the Legislature of New Jersey, approved May 15, 1894, is worthy of the attention of projectors of Companies, gas and otherwise. The act which relates to corporations of other States doing business in New Jersey, provides that on and after the 1st day of July, 1894, no such corporation, other than banking, insurance and railroad companies, shall transact business in New Jersey until it shall have filed in the Department of State (1) an attested copy of its charter or certificate of organization, and (2) a statement of its capital stock authorized, amount issued, character of its business, and designating a citizen or corporation in the State upon whom local service may be made—in certain cases service may be made upon the Secretary of State. Upon filing those papers the Secretary of State shall issue a certificate authorizing the corporation to transact business in New Jersey. The fees are $5 for filing each paper, and $5 for certificate of authority, or a total of $15. For service of process on Secretary of State, $2. In addition to the foregoing. a retaliatory feature was enacted, which provides that, "When by the laws of any other State or Nation, any other taxes, fees, penalties, licenses, fines or other obligations or requirements are imposed upon such corporations of this State doing business in such other State or Nation, or upon their agents therein, so long as such laws continue in force, the same taxes, fees, penalties, licenses, fines, obligations or requirements, of whatever kind, shall be imposed upon all such corporations of such other State or Nation doing business within this State and upon their agents here." There is a proviso that no previously established requirements shall be affected by this act; and copies of the act, together with blank forms for compliance, may be obtained by addressing the Secretary of State (Mr. Henry C. Kelsey) at Trenton.

THE Washington (D. C.) Gas Light Company is before the local courts on a charge of violating the act for the preservation of fish in the Potomac river, and for the pollution in general of the waters thereof; the pollution being the result of permitting its drainage to flow into the eastern branch of the river.

THE Eau Claire (Wis.) gas works, it is said, have passed into the hands of new parties, the controlling interest being held by Mr. David Douglas, General Superintendent of the Minneapolis Gas Light Company. We understand that Mr. Douglas will remove to Eau Claire.

THOMAS DOLAN is suing the Laclede Gas Company, of St. Louis, for $20,000 damages. Complainant, who is a fireman, received a severe shock while in the performance of his duty, on April 19, 1894, at fire in Thomas street, the shock resulting from contact with a defectively insulated electric light wire of the defendant Company.

THE case of William A. Fisher, executor of Jas. Boyce, against John A. Boyce, which was tried some days ago before Judge Dennis, in the Baltimore Circuit Court, was decided in favor of the defendant. The question at issue turned on the ownership of 10 shares of stock of the Gaston Coal Company, of West Virginia, valued at $1,500, which stood in the name of John A. Boyce, but which the plaintiff claimed belonged to the estate of Jas. Boyce, and had been placed in the name of the defendant simply to enable him to become a Director of the Company. The Court, however, decided that the facts did not sustain this theory, and that the stock belonged absolutely to defendant.

THE Union Fuel and Illuminating Gas Company, which proposes to transact business in Des Moines, Iowa, has filed articles of incorporation. It is capitalized in $100,000, and its officers are: President and Secretary, L. A. Wilkinson; Vice-President and Treasurer, Enos B. Hunt.

APPLICATION has been made for a charter for the Lansdowne and Yeadon (Pa.) Gas Company, by Messrs. W. H. Whiteley, W. L. Verlenden, E. Verlenden, Jr., Edwin Whiteley, C. R. Verlenden and G. S. Drewes. The application covers the boroughs of Lansdowne, Yeadon, Clifton, Aldan, Colwyn and Darby. It is said the Darby Gas Company, which holds the franchise for this territory, will interpose no objection. The new Company will have its headquarters at Lansdowne.

A CORRESPONDENT at Chester (Pa.) writes: "It was said that when the Chester Electric Light Company began operations here, gas stock would decline and soon be comparatively worthless, as the newer light would entirely supersede it. As an actual fact there is now more gas consumed than ever, and the Company's pipe mileage is greater than before. While the electric light installation shows a steady growth, gas keeps pace with it. The reduction in the price and the introduction of gas stoves have had much to do with this increase in business. That gas has a great future is evidenced by the new Companies recently organized in this county, as many applications for charters for such Companies are now pending before the Department of State."

THE City Council of Minneapolis named B. F. Nelson to represent it on the Board of Arbitration to regulate gas rates. The Company's representative, as stated before, is W. J. Murphy, and the two named have agreed upon Gen. George P. Wilson as the third member. The trio will arrange to have the hearings on the question at an early date.

IN connection with the Minneapolis gas question we reproduce the following from the ordinance recently passed by Councils, entitled an ordinance to provide for the "appointment of an inspector of gas, and defining the duties of such officer," etc.: "Sec. 2. It shall be the duty of said inspector of gas, when requested, to inspect, examine, prove and ascertain the accuracy of any and all meters used or intended to be used for measuring and ascertaining the quantity of gas furnished by the Minneapolis Gas Light Company to a consumer of gas within the city of Minneapolis; and when found to be correct, to seal, stamp or mark all such meters, and each of them, with some suitable device, which shall be recorded in the office of the City Clerk. It shall also be the duty of said inspector of gas to make tests of the illuminating and heating power and tests of the purity and specific gravity of the gas furnished consumers within the city of Minneapolis by said Company, and to make tests of the pressure maintained throughout the gas mains of the city of Minneapolis. From and after the 1st day of January, 1895, the inspector of gas shall perform all the duties now imposed upon the light inspector of the city of Minneapolis, and the office of light inspector of said city shall be abolished from and after that date. * * * Sec. 4. The inspector of gas of the city of Minneapolis, or his authorized deputy, shall have the right at any time to direct the Minneapolis Gas Light Company to remove any meter of said Company, between the hours of 8 A.M. and noon of any week day, from the premises of any consumer, in the presence of said inspector, and to turn it over to said inspector, for the purpose of testing said meter; and the said Company shall, whenever deemed necessary by such inspector, be required to supply to any consumer whose meter may be removed for inspection, another meter for use during the time required for such inspection. Whenever said Company shall fail to so remove any meter under the direction of said inspector, it shall be lawful for said inspector to remove such meter for the purpose of testing the same. Any consumer of gas within the city shall have the right, on paying to the inspector of gas a fee of $1, to have his meter tested, and may be present at any such test, if he so desires; and the Minneapolis Gas Light Company shall, in all cases, have notice when such test is to be made. There shall be three tests made of gas meters by said inspector of gas: First, to prove accurately the registration of the meter, by means of the standard prover in ordinary use; second, to prove the steadiness of the light and the freedom of the meter from leakage; third, to prove that the meter registers small quantities of gas. If any meter on being so tested shall be found to register quantities incorrectly to an extent exceeding 2 per cent., or if under the second test said meter is found to leak, or if any noticeable fluctuation in the light is observed, or if under the third test the meter fails to register small quantities of gas consumed, the meter shall be turned over to the Minneapolis Gas Light Company for re-adjustment, and the same shall not be used again until the defect is remedied, the meter again inspected by said inspector of gas and found to be correct and duly sealed. Every meter shall be considered correct as to the first test and so certified and sealed which shall register quantities varying not more than 2 per centum from the standard measure of gas. Whenever such meter, on being tested, shall be found to register incorrectly to the injury of the consumer to an extent exceeding 2 per cent., the fee of $1 paid by said consumer for each inspection shall be repaid to said consumer. All fees received by the inspector of gas shall be accounted for by him monthly, and shall be paid by him into the City Treasury monthly and monthly reports thereon submitted by him to the City Council." * * * Having provided for an official badge or seal for new and re-inspected meters, to be placed on said meter by the inspector, Section 5 of the ordinance further declares, "It shall be unlawful for any person other than said inspector or his deputies to deface, alter or remove any card so placed by the inspector upon any meter, or to place upon any meter a certificate purporting to be the certificate of said inspector. Sec. 6. The gas furnished by the Minneapolis Gas Light Company for illuminating purposes within the city of Minneapolis shall be so manufactured by said Company that such gas shall be merchantable illuminating gas of not less than 25 sperm candles; that is, of such quality that the burner consuming 5 cubic feet per hour, at a pressure not exceeding $\frac{1}{10}$ths inches at the photometric burner shall give a light as measured by the photometric apparatus in ordinary use of not less than 25 sperm candles, 6 to the pound, each consuming 120 grains per hour. The burner used in all tests shall be the ordinary lava-tipped fish tail or bat's wing burner. In case the full illuminating value of the gas furnished by said Company is not given by the burner above described, such burner shall be used as will give the full amount of light obtainable from the gas. If the Minneapolis Gas Light Company shall at any time make and furnish to the people of the city of Minneapolis an all coal gas the candle power thereof shall be not less than 18 candle power under the the test hereinbefore provided, except that the water pressure shall not exceed $\frac{6}{10}$ths inches. Said gas to have the illuminating quality above specified as it leaves the holder of said Company. Such quality to be determined by monthly average of semi-weekly tests made by the inspector of gas of the city of Minneapolis. In all tests of gas made at places in the city of Minneapolis other than at the holders of said Company, a proper correction shall be made for the necessary depreciation in the illuminating power of said gas in passing from the holder to the point at which such test is made. Said Minneapolis Gas Light Company shall so adjust its mains for the distribution of gas that the illuminating power of gas in the mains within a radius of 1½ miles of its works shall be at least 92 per cent. of the illuminating power of said gas when it leaves the holder of said Company. Sect. 7. * * * For the purpose of making tests of said gas a room shall be provided and fitted up at the expense of the city of Minneapolis at some place not more than 1½ miles distant from the works of said Gas Company; and the Gas Company shall conduct, or permit to be conducted, gas from its main nearest such room to such room by such pipes as the inspector of gas may direct, adapted for submitting such gas to all tests required by this ordinance." Sections 8, 9 and 10 provide for the testing of the gas for purity, specific gravity, "heat units," and so on; and it is stipulated that the Gas Company may have a representative present at such testings. Section 12 is: "If the Minneapolis Gas Light Company shall fail to furnish to consumers of gas within the city of Minneapolis of the quality prescribed in Section 6 of this ordinance, as shown by the average of semi-weekly tests, as provided in Section 7 of this ordinance, during any month, then the Minneapolis Gas Light Company shall forfeit and pay to the city of Minneapolis a sum of money, the amount of which shall be determined as follows: In case of other than all coal gas, for each candle power that the illuminating power of the gas actually furnished is less than 25-candle power, said sum shall be one twentieth of the entire sum paid to said Gas Light Company by consumers of metered gas within the city of Minneapolis for such month; in case of all coal gas said sum shall be for each candle power that the illuminating power of said gas is less than 18 candle power, one fifteenth of the sum so paid to said Gas Light Company by consumers of metered gas within the city of Minneapolis for such month."

AT the annual meeting of the Westerly (R. I.) Gas and Electric Light Company the officers chosen were: Directors, Edwin Babcock, A. L. Chester, Peleg Clarke, Wm. Segar and G. H. Utter; President, A. L. Chester; Secretary and Treasurer, William Segar.

THE Hon. R. F. Briggs, a prominent merchant of Amesbury, Mass., and a Director in the Amesbury Gas Light Company, died at his home in that town on the night of May 25. He was in his 58th year.

MESSRS. DAVIS & FARNUM, of Waltham, Mass., will furnish most of the iron work (including the gas holder) for the new plant at Laconia, N. H.

A SERIOUS explosion occurred on the morning of May 24th at the works of the West Manayunk (Pa.) Gas Light Company. The loss, which will not exceed $1,500, was directly attributable to the recent freshet in the Schuylkill river.

THE AMERICAN GAS LIGHT JOURNAL

A. M. CALLENDER & CO.,
PROPRIETORS.

MONDAY, JUNE 4, 1894.

The Market for Gas Securities.

Consolidated opened to day (Friday) at 134 bid, offered at 135, ex-div., of 2 per cent., which is payable on and after June 10th, and the market for it looks fairly firm. Meanwhile it is said that the East River Company has a corps of canvassers out, who are authorized to make contracts for a future supply of gas at the rate of $1 per 1,000 cubic feet. The tunnel is fairly along toward completion, and the manufacturing department on the Long Island side of the East river is also well advanced, but even with everything favorable for the completion of the scheme, and making no allowance for any mishaps whatever in the Company's ventures "on land and sea," a year must elapse at least before the concern can supply gas on its own account. At the annual meeting of the Company (the complete title of which is the New York and East River Gas Company) the following officers were chosen: Directors, Frederick Cromwell, George G. Haven, Emanuel Lehman, August Belmont, H. B. Hollins, R. T. Wilson, Chas. F. Cutter, Emerson McMillin and Robert Goelet; President, E. McMillin; First Vice-President, Emanuel Lehman; Second Vice-President, R. M. Young; G. G. Haven, Jr., Secretary and Treasurer; Assistant Secretary and Treasurer, Seymour F. Cromwell. The Brooklyn situation shows no simplification, the pulling and hauling still being the prominent feature. The shares, however, show signs of hardening, whence it may be possible that reason is about to return to the "managers," of whom (as those who know anything about the Brooklyn situation are conversant with) there are many. Chicago gas is strong, having sold up this week to 74¼, the price to-day at noon being 73½ bid. Baltimore Consolidated is somewhat weaker, at 63 to 63¼. We note a sale at auction of 30 shares Gate City Company (Atlanta, Ga.), at 100½.

Gas Stocks.

Quotations by Geo. W. Close, Broker and Dealer in Gas Stocks,
16 Wall St., New York City.

June 4.

☞ All communications will receive particular attention.
☞ The following quotations are based on the par value of $100 per share.

	Capital.	Par.	Bid	Asked
Consolidated	$35,430,000	100	134	135x
Central	500,000	50	100	—
" Scrip	220,000	—	100	—
Equitable	4,000,000	100	185	188
" Bonds	1,000,000	—	106	108
Metropolitan, Bonds	658,000	—	108	112
Mutual	3,500,000	100	150	—
" Bonds	1,500,000	—	100	102
Municipal, Bonds	750,000		—	—
Northern		50	80	95
" Bonds	150,000	—	—	100
Richmond Co., S. I.	348,650	50	50	—
" Bonds	100,000	—	—	—
Standard Gas Co—				
Common Stock	5,000,000	100	—	31
Preferred	5,000,000	100	76	78
Yonkers		50	112	—
Gas Co's of Brooklyn.				
Brooklyn	2,000,000	25	—	107
Citizens	1,200,000	20	50	—
" S. F. Bonds	320,000	1000	—	101
Equity Gas Light Co	2,000,000	100	—	—
Bonds	1,000,000	—	—	—
Fulton Municipal	3,000,000	100	130	132
" Bonds	300,000		103	—
Peoples	1,000,000	10	—	70
" Bonds (7's)	368,000	—	100	—
" " (6's)	94,000	—	98	100
Metropolitan	870,000	100	132	136
" Bonds (5's)	70,000	—	100	—
Nassau	1,000,000	25	—	160
" Ctfs	700,000	1000	99	100
Williamsburgh	1,000,000	50	138	—
" Bonds	1,000,000	—	107	110
Out of Town Gas Companies.				
Bay State Gas Co.—				
Stock	5,000,000	50	14½	16
Income Bonds	2,000,000	1000	60	—
Boston United Gas Co.—				
1st Series S.F. Trust	7,000,000	1000	78	—
2d " " "	3,000,000	1000	57	58
Buffalo Mutual, N. Y.	750,000	100	121	125
" Bonds	200,000	1000	95	100
Citizens, Newark	1,000,000	50	155	160
Chicago Gas Company.	25,000,000	100	73⅜	73½
Chicago Gas Light & Coke Co.—				
G't'd Gold Bonds	7,650,000	1000	81⅛	81½
Consumers Gas Light Co., Jersey City	2,000,000	100	44	—
Bonds	600,000	1000	85	—
Cincinnati G. & C. Co.	7,000,000	100	192	—
Consumers Toronto	1,600,000	50	184½	187
Central, S. F., Cal			—	100
Capital, Sacramento, Cal			—	55
Consolidated, Balt	11,000,000	100	63	63¾
" Bonds	6,400,000		107	107½
Citizens Gas Lt. Co., Rochester, N. Y.	500,000	—	85	101
Bonds	250,000		—	—
Detroit Gas Co.—				
Con. Bonds			60	—
East River Gas Co., Long Island City	1,000,000	100	—	—
Bonds	500,000	100	89¼	—
Equitable Gas & Fuel Co., Chicago, Bonds	2,000,000	1000	—	101
Hartford, Conn	750,000	25	120	128
Jersey City	750,000	20	190	200
Louisville, Ky	2,570,000	50	125	130
Laclede Gas Light Co. St. Louis, Mo.—				
Common Stock	7,500,000	100	16¾	17
Preferred "	2,500,000	100	68	71
Bonds	9,034,400	1000	—	87
Little Falls N. Y.	50,000	100	—	100
" Bonds	25,000	—	100	103
Montreal, Canada	2,000,000	100	200	208
New Haven, Conn		25	200	—
Oakland, Cal			42⅝	43
People's Gas and Coke Co., Chicago—				
1st Mortgage	2,100,000	1000	—	108
2d "	2,500,000	1000	104	105
Peoples, Jersey City		—	160	170
" " Bonds			—	—
Paterson, N. J		25	99	102
Rochester, N. Y		50	80	85
Preferred			90	95
Bonds			90	95
Syracuse, N. Y	500,000	25	—	—
San Francisco Gas Co. San Francisco, Cal	10,000,000	100	65½	66
Washington, D. C	2,000,000	20	240	—
Wilmington, Del.	500,000	50	180	182

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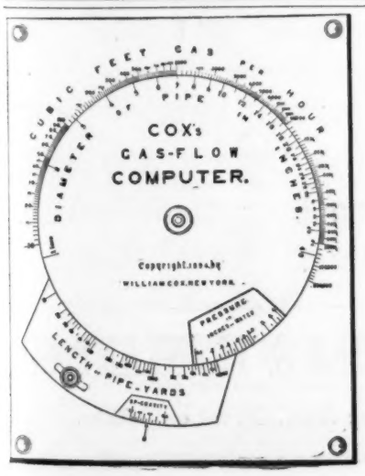

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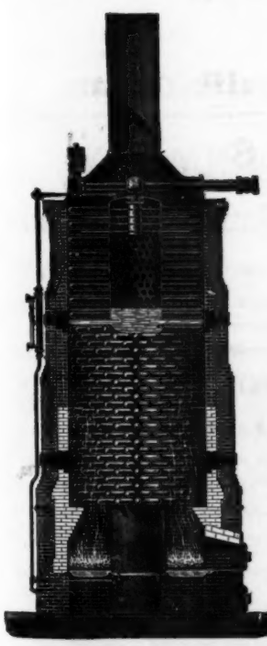

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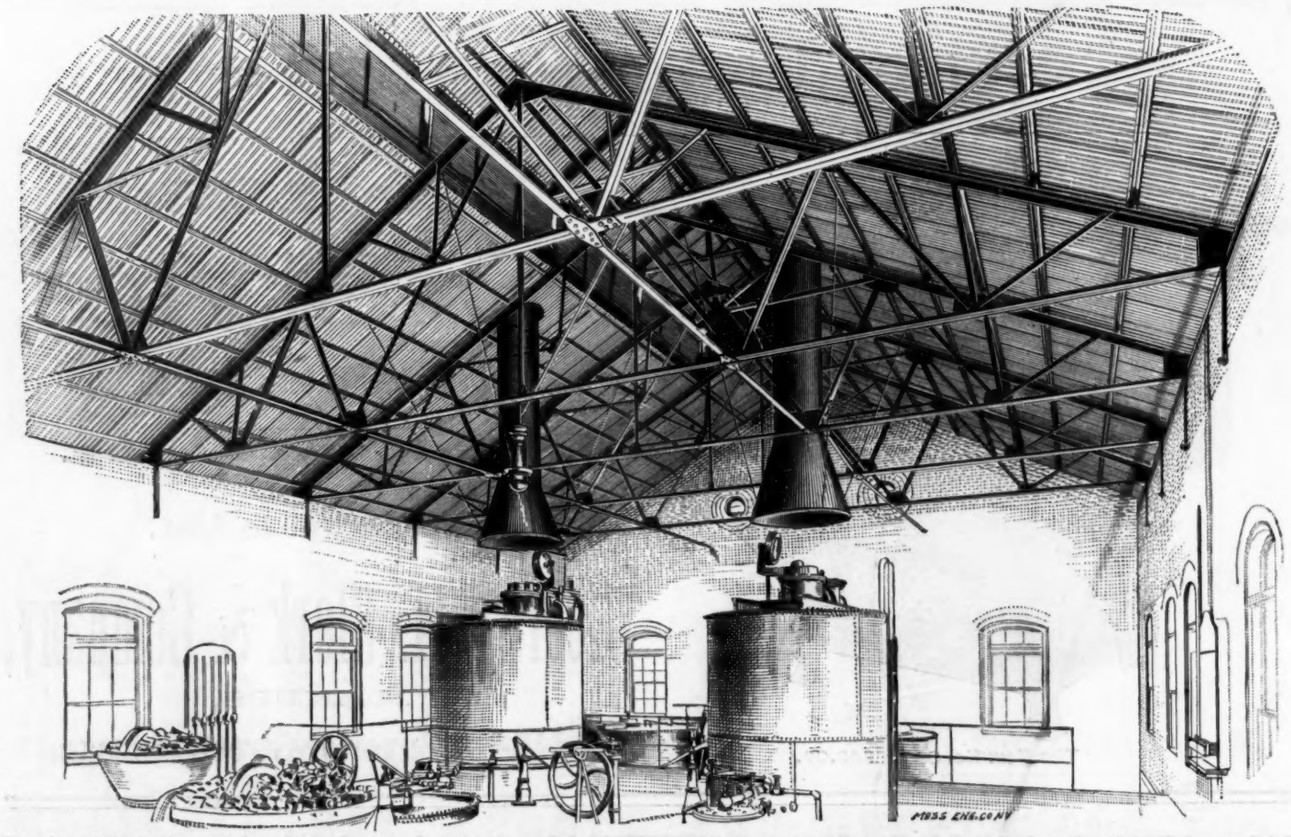

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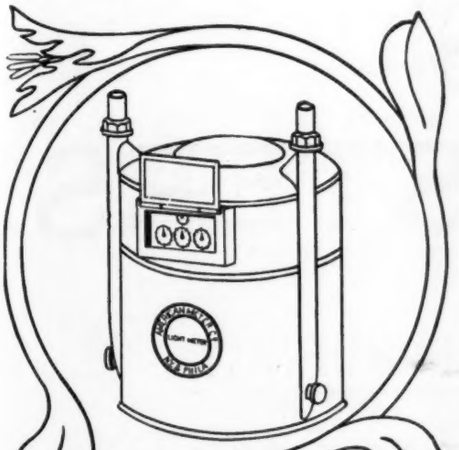

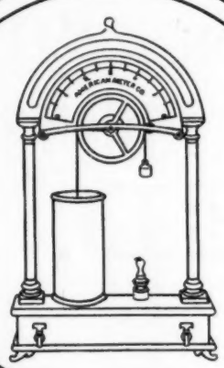

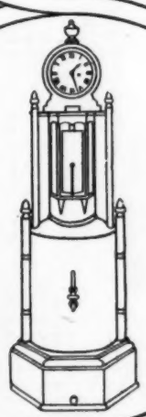

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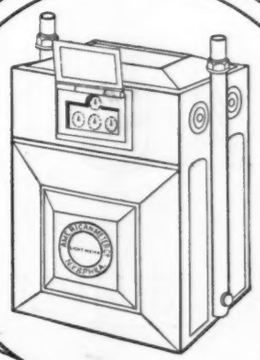
PUBLIC LIGHTING TABLE.

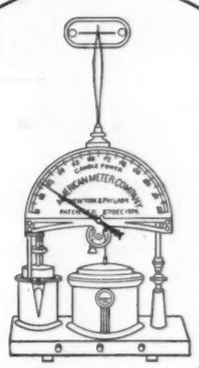
JUNE, 1894.

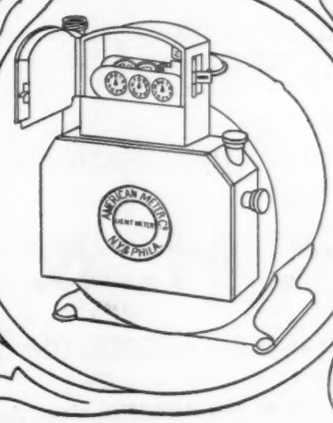
Day of Week.	Table No. 1. Following the Moon. Date.	Light.	Extinguish.	Table No. 2. New York City. All Night Lighting. Light.	Extinguish.
				P.M.	A.M.
Fri.	1	7.50 PM	3.30 AM	7.15	3.15
Sat.	2	7.50	3.30	7.15	3.15
Sun.	3	7.50 NM	3.30	7.15	3.15
Mon.	4	7.50	3.30	7.25	3.15
Tue.	5	7.50	3.30	7.25	3.15
Wed.	6	7.50	3.30	7.25	3.15
Thu.	7	8.00	3.30	7.25	3.15
Fri.	8	10.50	3.30	7.25	3.15
Sat.	9	11.20	3.30	7.25	3.15
Sun.	10	11.40 FQ	3.30	7.25	3.15
Mon.	11	12.00	3.30	7.25	3.15
Tue.	12	12.30 AM	3.30	7.25	3.15
Wed.	13	12.50	3.30	7.25	3.15
Thu.	14	1.20	3.30	7.25	3.15
Fri.	15	1.50	3.30	7.25	3.15
Sat.	16	No L.	No L.	7.25	3.15
Sun.	17	No L.	No L.	7.25	3.15
Mon.	18	No L. FM	No L.	7.30	3.15
Tue.	19	8.00 PM	10.10 PM	7.30	3.15
Wed.	20	8.00	10.50	7.30	3.15
Thu.	21	8.00	11.20	7.30	3.15
Fri.	22	8.00	11.50	7.30	3.15
Sat.	23	8.00	12.10 AM	7.30	3.15
Sun.	24	8.00	12.30	7.30	3.15
Mon.	25	8.00	12.50	7.30	3.15
Tue.	26	8.00 LQ	1.10	7.30	3.15
Wed.	27	8.00	1.30	7.30	3.15
Thu.	28	8.00	2.00	7.30	3.15
Fri.	29	8.00	2.40	7.30	3.15
Sat.	30	8.00	3.30	7.30	3.15

TOTAL HOURS LIGHTING DURING 1894.

By Table No. 1.	Hrs. Min.	By Table No. 2.	Hrs. Min.
January	244.10	January	423.20
February	195.30	February	355.25
March	206.20	March	355.35
April	169.40	April	298.50
May	162.10	May	264.50
June	135.40	June	234.25
July	146.30	July	243.45
August	162.20	August	280.25
September	174.10	September	321.15
October	211.20	October	374.30
November	221.00	November	401.40
December	245.30	December	433.45
Total	2274.20	Total	3987.45







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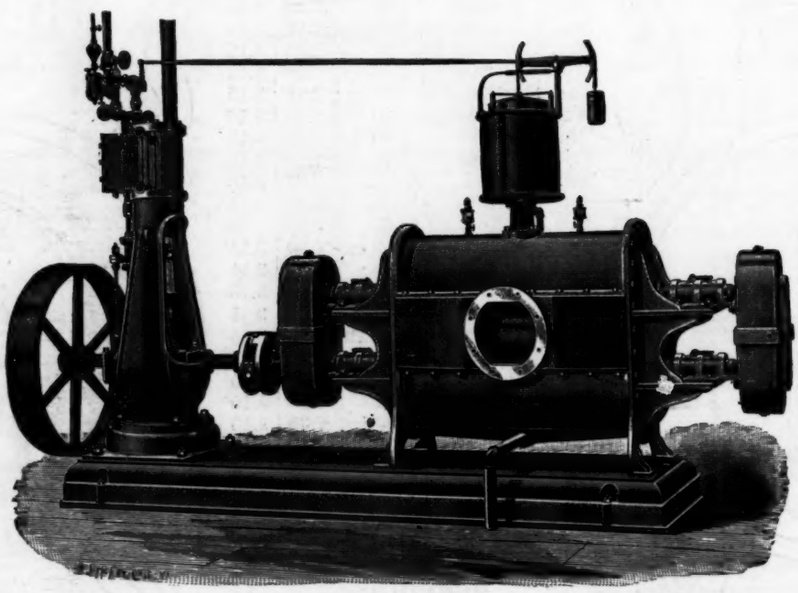

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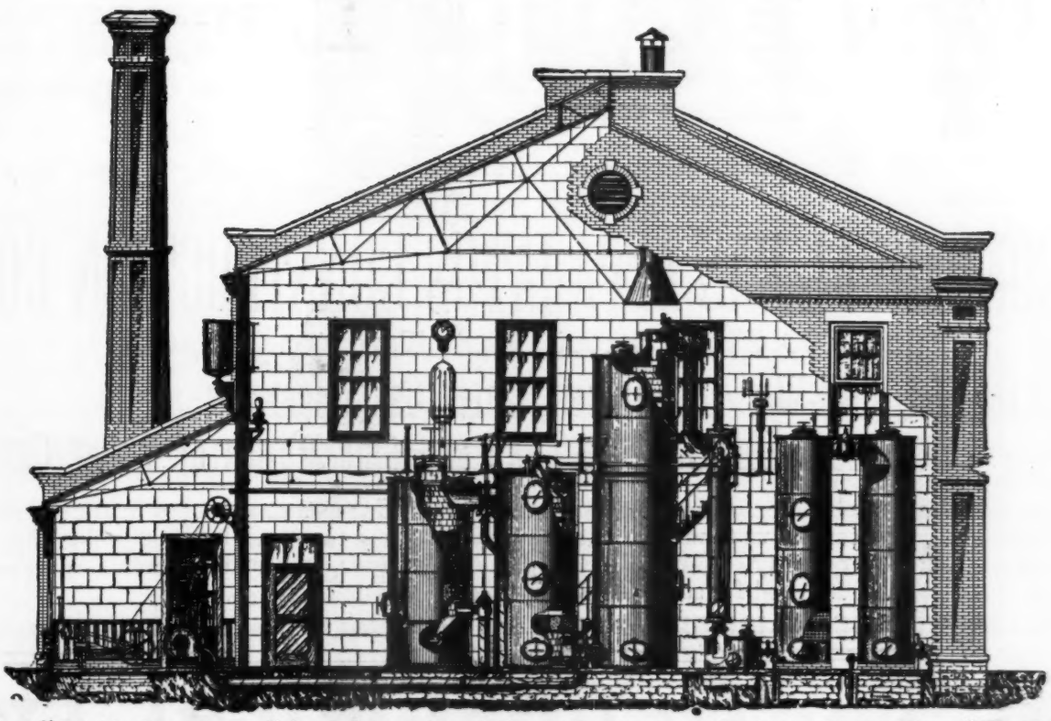

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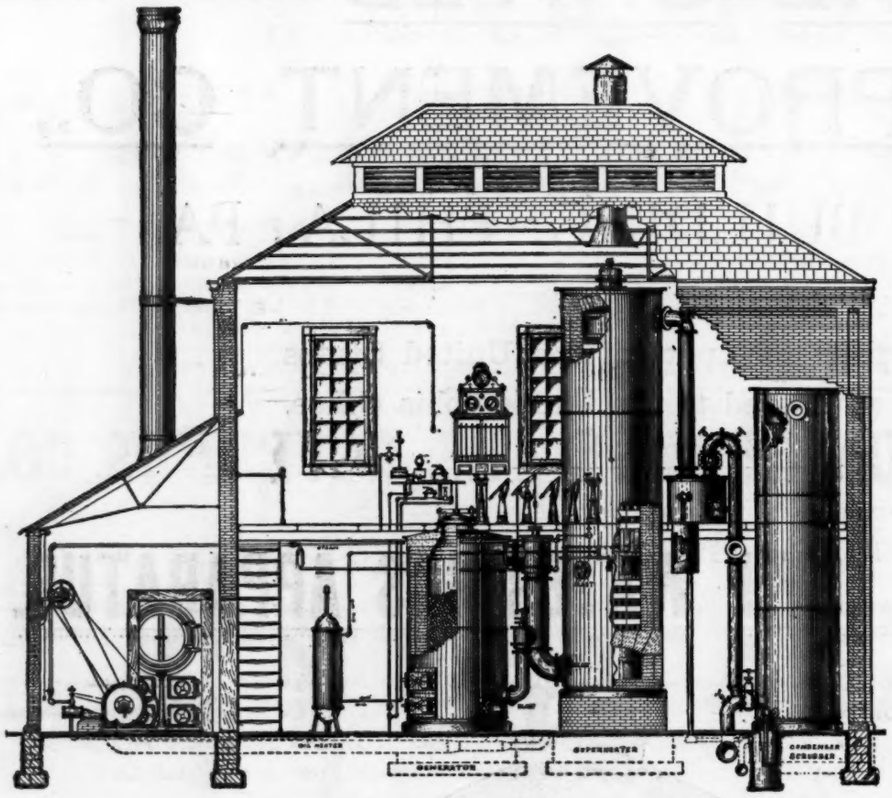

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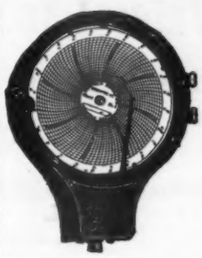

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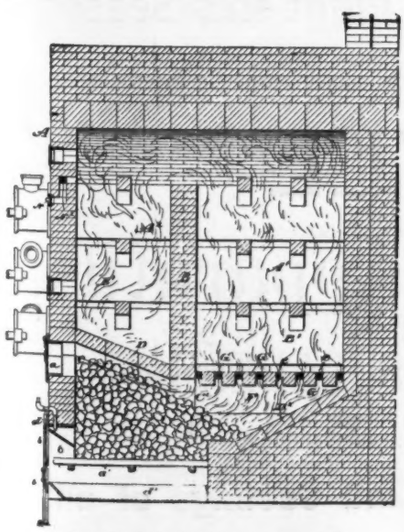

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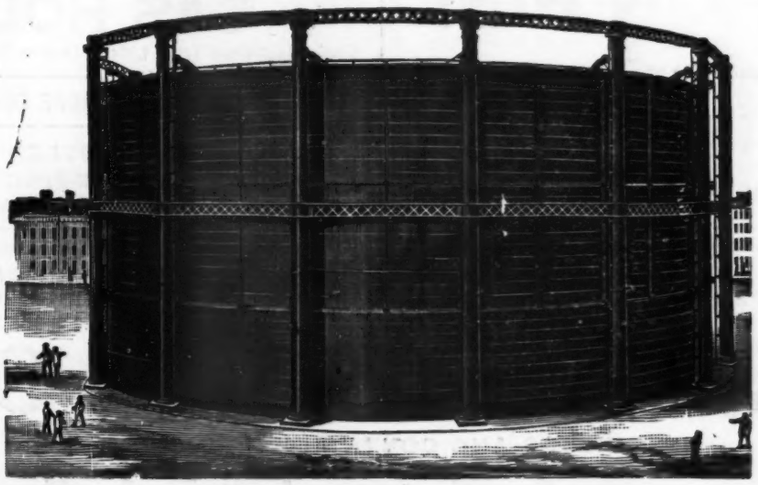

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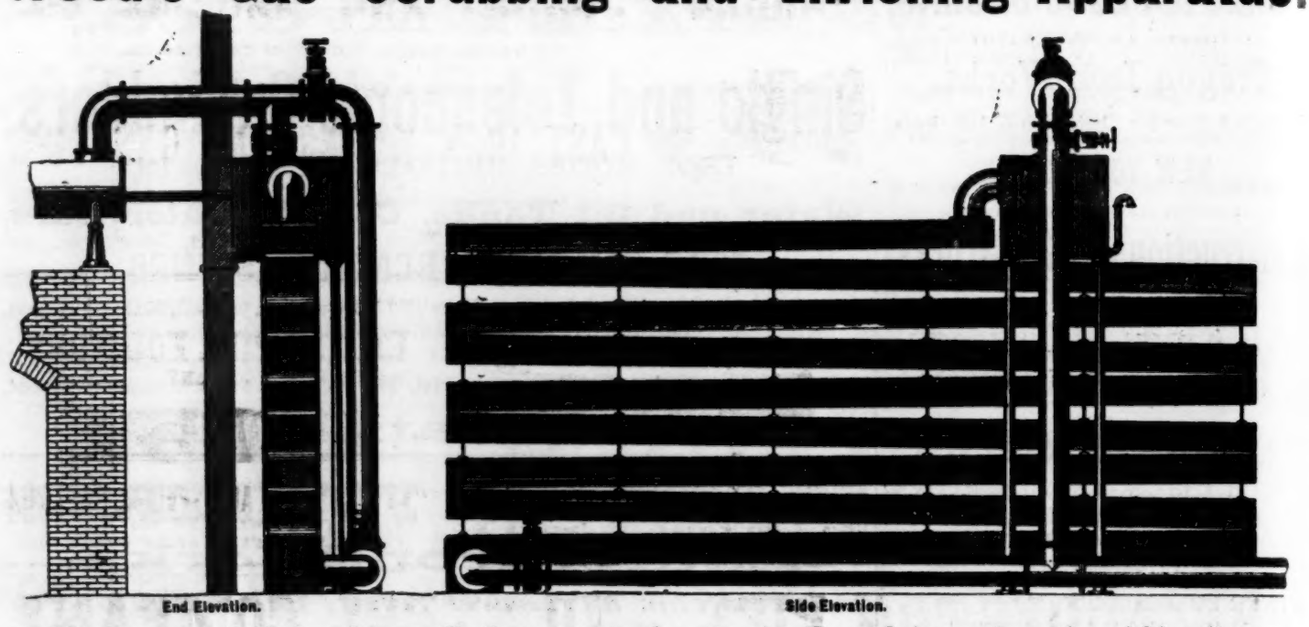

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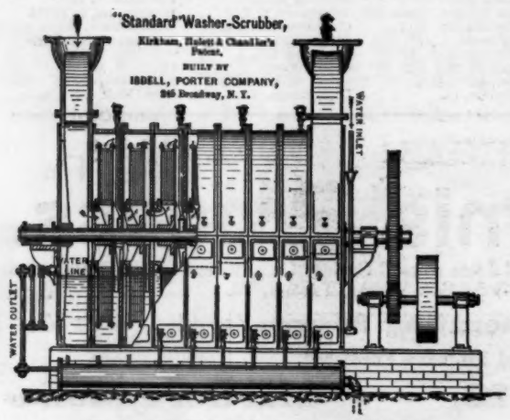

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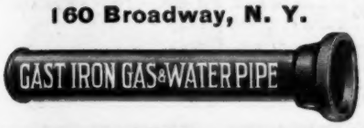

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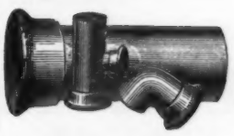

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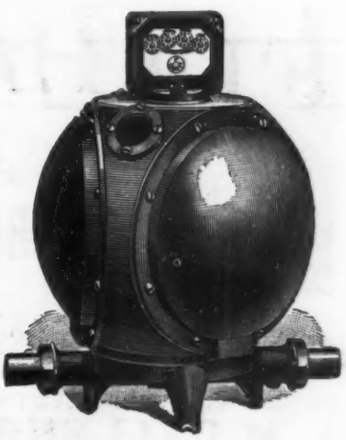

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